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NATIONAL DAM SAFETY PROGRAM. TROUT RUN DAM (NDI-PA.-481), OHIO --ETC(U)
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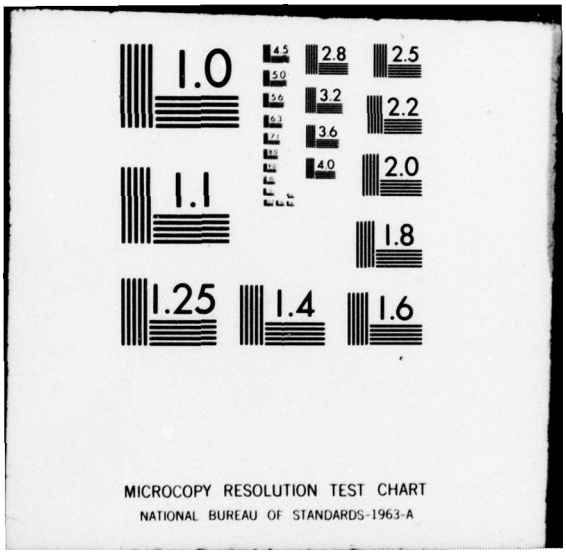
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OHIO RIVER BASIN
TROUT RUN, WESTMORELAND COUNTY
PENNSYLVANIA

(11) Oct 78

NDI No. Pa. - 481
TROUT RUN DAM

(6) National Dam Safety Program. Trout Run Dam (NDI-Pa.-481), Ohio River Basin, Trout Run, Westmoreland County, Pennsylvania. Phase I Inspection Report.

(12) 81 p.

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

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PREPARED FOR

DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland 21203

PREPARED BY

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OCTOBER 1978

PHASE I REPORT
National Dam Inspection Program

Trout Run Dam (Hillside Run Dam)

Pennsylvania

Indiana County

Trout Run

21 September 1978

Inspection Team - GAI Consultants, Inc.
570 Beatty Road
Monroeville, Pennsylvania 15146

Based on a visual inspection, past performance and available engineering data as well as a brief hydrologic and hydraulic investigation, the facility is considered to be in fair condition.

Hydrologic and hydraulic calculations indicate that the facility is capable of passing and/or storing 47% of the runoff associated with a PMF event. Hence, in accordance with screening criteria established by the Department of the Army, Office of the Chief of Engineers, the spillway is deemed to be 'seriously inadequate'.

The dam has a history of seepage problems and PennDER files make reference to a number of remedial programs which were conducted to remedy the problems. At the time of inspection seepage and/or saturated conditions were observed, in various areas at the toe of the embankment and in an area approximately 20 feet below the dam crest just to the right of the spillway sidewall. The cumulative effect of the seepage should be evaluated in terms of its possible bearing on the stability of the structure, particularly at higher pool levels.

Based on the above mentioned considerations, it is recommended that the owner:

a. Enlist the services of a registered professional engineer experienced in the design and construction of dams to more accurately assess the adequacy of the discharge system at the facility. Subsequently, the owner should make any modifications deemed necessary to insure that the facility will function adequately during a PMF event.

b. Enlist the services of a registered professional engineer, experienced in design and construction of earthen embankments, to assess the structural adequacy of the embankment under all possible operating conditions. The seepage and saturated areas should be evaluated to determine what effect, if any, they have on the stability of the structure.

c. Develop a warning system to notify downstream residents should hazardous conditions develop. This should include provisions for round-the-clock surveillance during periods of unusually heavy rainfall.

d. Repair and/or replace the deteriorated portions of the spillway.

GAI Consultants, Inc.

Bernard M. Mihalcin

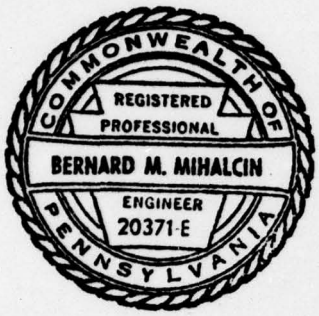
Bernard M. Mihalcin, P.E.

Date 21 Nov 78

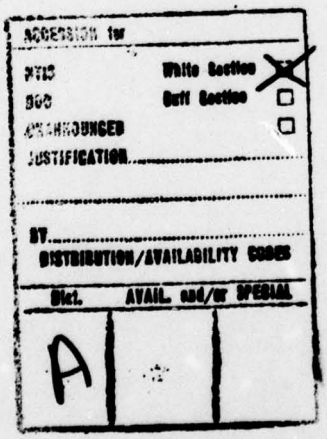
Approved by:

G. K. WITHERS
Colonel, Corps of Engineers
District Engineer

Date 21 Dec 78



Under the recently revised spillway evaluation guidelines, this dam is considered unsafe, non-emergency.



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OVERVIEW PHOTOGRAPH OF TROUT RUN DAM

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
TROUT RUN DAM
NDI# PA 481, PENNDER# 65-78

SECTION 1
GENERAL INFORMATION

1.0 Authority.

The dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of inspection of dams throughout the United States.

1.1 Purpose.

The purpose is to determine if the dam constitutes a hazard to human life or property.

1.2 Description of Project.

a. Dam and Appurtenances. Trout Run Dam is an earthen embankment with a concrete corewall. The overall length of the structure is 582 feet and its maximum height is 41 feet. The facility is equipped with a spillway on the left abutment as well as a 30-inch diameter cast iron blow-off pipe and a 12-inch diameter supply pipe encased in concrete beneath the embankment. The lines are gated in a control tower located upstream of the corewall of the embankment, left of dam center (see Photograph 1). (cont on pi)

b. Location. Trout Run Dam or Hillside Run Dam, as it is locally known, is located on Trout Run in Indiana County, Pennsylvania approximately 3 miles northeast of the community of Derry. Dam, reservoir and watershed are located on the Derry and Wilpen, U.S.G.S., 7.5 minute Quadrangles.

c. Size Classification. Intermediate (41 feet high - 130 acre-feet of storage at the top of the dam).

d. Hazard Classification. High (see Section 3.c.4)

e. Ownership. Borough of Blairsville, 224 South, Stewart Street, Blairsville, Pennsylvania 15717.

f. Purpose of Dam. Water supply serving the Borough of Blairsville.

g. Historical Data. Data available from PennDER files indicate that construction of the facility was initiated on September 1, 1926, by the John F. Casey Company of Pittsburgh,

Pennsylvania. Work was completed in the fall of 1927 without any major modifications or delays.

Numerous inspection reports were issued by predecessors of PennDER beginning shortly after construction. The initial reports made mention of seepage in various areas at the toe of the embankment, flow through drains which emptied into the spillway outlet channel and through the embankment at a point to the right of the right spillway side wall just above the berm. Seepage was also noted near the right valley wall approximately 150 feet downstream of the dam toe.

In November 1932 trenches were excavated downstream of the core wall into the rock foundation in which openings were encountered. Some concrete was subsequently poured and a grouting program initiated to cut off the seepage. An April 1933 Inspection Report suggests that the remedial work was successful although details are not provided. This same report, however, indicates that "considerable leakage" was observed near the toe of the slope at the extreme right end of the embankment.

Subsequent inspection reports make reference to seepage problems in the same areas as mentioned above, however, the frequency of inspections diminishes after the 1940's and little is known about the history and performance of the facility over the last 30 years.

1.3 Pertinent Data.

a. Drainage Area. 2.3 square miles

b. Discharge at Dam Site.

Outlet Works Conduit - Discharge at normal pool ≈ 130 cfs.

Spillway Capacity at Maximum Pool ≈ 1900 cfs.

c. Elevation (feet above mean sea level).

Top of Dam - 1260.

Maximum Pool Design Surcharge - Not Known.

Maximum Pool of Record ≈ 1259.

Normal Pool (spillway crest) ≈ 1256.

Upstream Portal Invert Outlet Conduit ≈ 1228.

Downstream Portal Invert Outlet Conduit ≈ 1228.

Streambed at Centerline of Dam ≈ 1218.

Maximum Tailwater - Not known.

d. Reservoir.

Length of Maximum Pool (1260) ≈ 1,000 feet.

Length of Normal Pool (1256) ≈ 760 feet.

e. Storage (acre-feet).

Spillway Crest ≈ 98.

Top of Dam ≈ 130.

Design Surcharge - Not known.

f. Reservoir Surface Area (acres)

Spillway Crest ≈ 8.0.

Top of Dam ≈ 8.0.

g. Dam.

Type - Earthfill with a concrete core wall.

Length - 582 feet.

Height - 41 feet.

Top Width - 12 feet (field measured).

Side Slopes - 2-1/2H:1V
Upstream - 2H:1V
Downstream - 2H:1V

Zoning - Trout Run Dam is an homogenous earth dam although the contract specifications indicate that the more pervious material should be placed downstream of the cut off wall.

Impervious Core - A concrete corewall extends from the foundation to elevation 1259.

Grout Curtain - 3-1/4 inch diameter well casing was placed on 8.0' centers along the centerline of the corewall. No grouting, however, was performed during the initial construction.

h. Outlet Conduit.

1. Blow-off Line.

Type - 30 inch diameter cast iron pipe encased in concrete and buried in a trench beneath the embankment.

Length - ≃ 210 feet.

Closure - Valved within gate house accessible from the crest.

2. Supply Line (Embankment Section)

Type - 12-inch diameter cast iron pipe encased in concrete.

Length - ≃ 210 feet.

Closure - Valved within gate house accessible from the crest.

Regulating Facilities - Discharge is controlled via a gate located just beyond a concrete block chlorination house located approximately 150 yards downstream of the embankment.

i. Spillway.

Type - Uncontrolled ogee-crested spillway located at the left abutment.

Crest Length - 61 feet.

Channel Length - ≃ 260 feet.

Crest Elevation - 1256.

Upstream Channel - Concrete lined forebay extending approximately 40 feet upstream of the weir.

Downstream Channel - Rectangular concrete chute type spillway discharging into the rock lined Trout Run streambed about 260 feet downstream of the weir.

j. Regulating Outlets. The 30-inch diameter blow-off line is controlled by a gate valve on the operating floor of the gate house. The 12-inch diameter supply line is controlled in a similar manner; however, water can enter the gate house structure from two elevations within the reservoir (see Figure 5).

SECTION 2
ENGINEERING DATA

2.1 Design.

a. Design Data Availability and Sources.

1. Hydrology and Hydraulics. No design data are available.

2. Embankment. No design calculations are available. Embankment and subsurface details are provided on as-built drawings and specifications available from PennDER files.

3. Appurtenant Structures. No design calculations are available. Structural details are shown on drawings supplied from PennDER files.

b. Design Features.

1. Embankment. Contract drawings, specifications, and construction reports indicate that the structure is a rolled earthfill structure containing a concrete core wall which was carried down to rock (see Figure 3). The upstream face is mantled with a 12-inch thick layer of stone paving and is sloped at 2.5H:1V. The downstream face is sloped at 2H:1V and the downstream toe is composed of rockfill but it does not appear that any internal drainage system was incorporated into the structure..

2. Appurtenant Structures.

a) Spillway. The spillway is an uncontrolled concrete chute type structure with an ogee-shaped crest. A concrete cut-off wall extends beneath the spillway to rock as shown on Figure 4. Two smaller concrete cutoffs were constructed in the approach channel of the spillway. The spillway chute is characterized as a curved rectangular channel which empties into a rock-lined portion of the Trout Run channel approximately 260 feet downstream of the crest.

b) Outlet Works. The facility is provided with a 30-inch diameter blow-off pipe which discharges into the spillway outlet channel. A 12-inch diameter supply line conveys water to a chlorination building located about 150 yards downstream of the dam. Both of these lines are gated within a concrete gate house located atop the dam crest. Details of the outlet system are shown on Figure 5.

c. Design Data and Procedures.

1. Hydrology and Hydraulics. No design data are available. A report dated August 18, 1926, contained in

PennDER files, indicates that the spillway has a maximum discharge capacity of 1900 cfs.

2. Embankment. No information relative to design data and/or design procedures were available.

3. Appurtenant Structures. No design data are available.

2.2 Construction.

Bi-weekly construction reports were prepared by the Borough Manager and are available in PennDER files.

2.3 Operational Procedures.

No operational records are available.

2.4 Other Investigations.

PennDER files indicate that periodic inspections were conducted through 1971. Inspection Reports are numerous for the period 1926 through 1941.

2.5 Evaluation.

a. Availability of Information. General engineering data in the form of contract drawings, specifications, and construction status reports are available from PennDER files. No specific design calculations are available.

b. Adequacy of Data. Sufficient data are available to make a general assessment of the facility.

SECTION 3
VISUAL INSPECTION

3.1 Observations

a. General. The visual inspection of the structure and related appurtenances suggested that the facility is in fair condition.

b. Embankment. The embankment is in conformance with the lines and grades depicted on the contract drawings supplied by PennDER. No signs of slope distress were observed at the time of inspection; however, three areas of seepage were observed at and beyond the embankment toe as well as on the downstream slope just above the berm near right sidewall of the spillway (see Figure 1, Appendix F). All of the seepage from the above areas were previously reported in inspection reports contained within PennDER files.

The embankment is provided with a rock toe at its base and a small pool of water was observed at the toe near the center of the embankment (see Photograph 9). According to the dam caretaker, this pool is drained by two pipes which discharge into the spillway outlet channel approximately 80 feet downstream of the concrete portion of the spillway. Acidic flow from mines above the left abutment also reportedly discharges through one of these drains and is the apparent source of the precipitate seen in Photograph 8. Discharge from these pipes was estimated to equal 6 GPM at the time of inspection. Seepage was also observed near the right side of the valley approximately 150 feet downstream of the dam. Flow in this area is estimated to be less than 5 GPM.

The seepage conditions on the downstream face adjacent to the spillway, near the berm elevation and about 20 feet below the crest seem to be related to a condition which has presented problems to the dam owners since shortly after reservoir filling. PennDER records make reference to trenches which were excavated on the downstream side of the core wall into the rock foundation. It is thought that additional concrete cutoff walls were constructed and at least one grouting program was carried out to eliminate the problem. In any event, the condition still persists and is of concern.

Perusal of the contract drawings (see Figures 3 and 4) indicates that the shortest seepage path through the embankment is at a position just to the right of the spillway. It seems possible that water is passing along or below the dam-foundation contact in this area and emerging in the area just above the berm. It is of further interest to note that boring records (see Figure 6) indicate that drilling water was lost and a broken sandstone encountered while drilling

Borings 3, 4, and 5. Bedding plane joints would be aligned in such a way which would promote the migration of water in a northwesterly direction across the valley. This problem is reinforced upon realization that the cutoff is probably founded on the broken sandstone on the entire left abutment because of the dip of the rock strata in the area.

c. Appurtenant Structures.

1. Gate House, Supply and Blow-off Lines. Trout Run Dam is provided with a 30-inch diameter blow-off and 12-inch diameter supply pipes both encased in concrete beneath the embankment.

The pipes are gated within a concrete and block gate house located atop the dam crest approximately 100 feet north of the spillway. According to the Borough Manager, all of the valves are in good operating order although none were operated in our presence. The controls on the outlet system were reportedly completely refurbished in 1972.

2. Spillway. The spillway at Trout Run Dam is a concrete chute type structure with an ogee-shaped crest. Ungated discharge is conveyed through the structure for approximately 260 feet where it enters the rock-lined Trout Run stream channel.

Severe scaling was observed on portions of the spillway apron and it was obvious that the structure had been patched over the years. The lowest (in elevation) two apron blocks have apparently moved or settled, but the overall appearance of the structure is good.

3. Reservoir Area. The slopes adjoining Trout Run Reservoir are steep and densely wooded. No signs of slope distress were observed at the time of inspection.

4. Downstream Channel. The area immediately downstream of Trout Run Dam is characterized as a narrow, moderate to steep-sided valley containing Trout Run (or Hillside Run as it is locally known). Numerous homes are located on the floodplain within 4,000 feet of the dam, in addition to the caretaker's residence which is located less than 50 feet from the embankment toe (see Photograph 3). Other improvements located within this reach include secondary road bridges and a 3-track spur of the PennCentral Railroad. Because of the above-mentioned considerations the hazard classification of the facility is "high".

3.2 Evaluation.

The dam and its appurtenances are reasonably well-maintained and in fair condition. There are noticeable

seepage and saturated areas at and beyond the toe of the embankment possibly indicating that the concrete core is ineffective as a cutoff. Saturated conditions were also observed on the downstream slope of the embankment in a large area with upper limits about 20 feet below the crest just to the right of the spillway outlet channel. Geologic conditions (see Appendix E) and an inadequate cutoff may be the primary reasons for the seepage at this location. In any event, the situation requires further study.

The appurtenant structures are reasonably well-maintained; however, scaling and some differential movements between spillway slabs are apparent which require evaluation and general remedial repair.

SECTION 4
OPERATIONAL PROCEDURES

4.1 Normal Operational Procedure.

Excess inflow is passed over the spillway and discharges into the stream channel below (see Photograph 6). The main valve on the supply line is kept open and discharge is controlled from a point downstream of the dam. The blow-off line is reportedly opened twice a year to clean the reservoir bottom near the supply inlet.

4.2 Maintenance of Dam.

A full-time caretaker resides in a home at the toe of the dam. During the past 45 years, maintenance has been provided by the caretaker and Blairsville Borough maintenance personnel. Grass is mowed and periodic maintenance performed on the spillway and gate controls. There is no formal maintenance program; however, the dam appeared to be well maintained.

4.3 Maintenance of Operating Facilities.

The gate controls for the outlet works require little maintenance. According to the Borough Manager, repairs were made in 1972 on the lower sluice gate valve stems and guides, etc. Stainless steel trash racks were also provided at this time. All valves are operated at least twice a year to insure workability.

4.4 Warning System.

There are no formal warning systems in effect at the site; however, a full-time caretaker resides on site.

4.5 Evaluation.

With the exception of some scaling and differential movement in the spillway slabs, the dam and its appurtenances appeared to be well-maintained. Mr. Bailey (Blairsville Borough Manger) is an experienced construction supervisor and is quite knowledgeable of the operation of the facility. A full-time caretaker also resides on site.

A formal warning system should be developed.

SECTION 5
HYDROLOGIC/HYDRAULIC EVALUATION

5.1 Design Data.

No hydrologic or hydraulic data are available.

5.2 Experience Data.

Discharge throughout the supply line is recorded daily and transmitted to the borough office. According to the Borough Manager and the caretaker, the highest recorded water level occurred in 1972 when the reservoir level rose to within 1 to 1.5 feet of the top of the embankment.

5.3 Visual Observations.

On the date of inspection, no conditions were observed which would suggest that the appurtenant structures of the dam would not function adequately during a flood event.

5.4 Overtopping Potential.

The ratio "PMF Peak Flow/Drainage Area" was determined from an empirical curve supplied by the Corps of Engineers, Baltimore District. The curve used was the Ohio River Basin Curve. Based on this curve and a drainage area of 2.3 square miles, peak PMF Q/A = 1890 cfs/sq mi and Peak PMF Q = 4347 cfs.

The size category is "intermediate" and the hazard rating "high"; consequently the design flood is the PMF (Recommended Guidelines for Safety Inspection of Dams).

Calculations were performed to evaluate the overtopping potential during a PMF event in which 26 inches of runoff was used to determine the inflow volume (3189 acre-ft).

The spillway has a maximum discharge capacity of approximately 1874 cfs. The outlet pipe has a capacity of 130 cfs bringing the total discharge capacity to 2004 cfs. This number is considerably less than the PMF peak inflow of 4347 cfs. Therefore, excess inflow must be stored before being discharged if the dam is not to overtop. Based on a normal pool elevation of 1256 feet and a top of dam elevation of 1260 feet, the available storage is approximately 32 acre-feet. This is significantly less than the required reservoir storage of 1722 acre-feet; therefore, it can be assumed that the dam would overtop if subjected to a storm of PMF intensity.

5.5 Spillway Adequacy.

The hazard rating for the Trout Run facility is "high". In its present condition, the spillway, 30-inch diameter

outlet pipe and dam are capable of passing and/or storing 47 percent of the PMF. It is anticipated that overtopping would result in failure of the dam and would undoubtedly increase the possibilities for loss of life downstream from that which would exist prior to overtopping; consequently, the spillway is considered seriously inadequate.

SECTION 6
EVALUATION OF STRUCTURAL INTEGRITY

6.1 Visual Observations.

a. Embankment. Based on visual observations, the embankment appeared to be well maintained and in fair condition. Several seepage areas or saturated zones were observed adjacent to the spillway, at the embankment toe and downstream.

Although the dam was provided with a concrete core wall which was carried from the top of rock to within one foot of the dam crest, seepage has been a continual problem at the site since it was noted shortly after construction. PennDER files contain references to trench excavations and additional core wall installation as well as remedial grouting programs. Grout pipes were observed protruding from the embankment at numerous points at the time of inspection.

Most of the seepage, observed as saturated areas at the time of inspection is concentrated around the left half of the embankment. It is interesting to note that the preconstruction borings indicate a broken sandstone as foundation material for the entire left abutment (see Figure 6). The drillers logs indicate that water was lost in Borings 3 and 4 at depths of approximately 10 feet and that the drilling water emerged out of the side of the stream bank of Hillside Run (Trout Run) just below the test holes. Compounding the problem is the fact that the dip of the rock strata in the reservoir area is northwest (see Geology in Appendix E) implying that units which crop out within the reservoir can transmit leakage along bedding plane joints beneath the dam.

In any event, saturated conditions were observed near the right sidewall of the spillway just above the elevation of the berm, about 20 feet below the dam crest. Saturated conditions were also observed just beyond the toe and a pool of water exists at the dam toe. These conditions require further evaluation, particularly with respect to their effect on embankment stability.

b. Appurtenant Structures. Based on a visual observation, the spillway appeared to be in good condition. Some severe concrete scaling was noted. Concrete slabs at the discharge end of the spillway had cracked and some differential movement was apparent.

6.2 Design and Construction Techniques.

Actual design data, design computations, or reports were not available for any aspect of the facility.

6.3 Past Performance.

Representatives of the Borough of Blairsville reported that during the rains associated with Hurricane Agnes, in 1972, the water rose to within 1 to 1.5 feet of the top of the dam. Some damage was reportedly done to the concrete and rock lined channel downstream of the spillway.

6.4 Seismic Stability

The dam is located within Seismic Zone No. 1 and because of the saturated conditions along the toe of the dam as well as the uncertainty of materials used in construction, it is possible that even minor earthquake induced dynamic forces could be significant. However, no investigations, calculations, etc., were performed to confirm this statement.

SECTION 7
ASSESSMENT AND RECOMMENDATIONS FOR REMEDIAL MEASURES

7.1 Dam Assessment.

a. Safety. The visual inspection and available engineering data suggest that the dam is in fair condition. The facility has a history of seepage problems, which were observed on the day of inspection. In addition, a brief hydraulic and hydrologic analysis conducted in accordance with U. S. Army Corps of Engineer guidelines indicates that the facility is capable of passing and/or storing 47 percent of the runoff associated with a PMF event without overtopping. The hazard rating for the facility is high. If Trout Run Dam should fail due to overtopping, the hazard to loss of life would be significantly increased, over that which would exist prior to overtopping. Based on criteria established by the Department of the Army, Office of the Chief of Engineers (OCE), the spillway is considered seriously inadequate.

b. Adequacy of Information. The available data is considered sufficient to make a reasonable Phase I assessment of the facility.

c. Urgency. It is suggested that the recommendations listed below be implemented immediately.

d. Necessity for Additional Investigations. The additional investigations, listed below are considered necessary.

7.2 Recommendations.

It is recommended that the owner:

a. Enlist the services of a registered professional engineer experienced in the design and construction of dams to more accurately assess the adequacy of the discharge system at the facility. Subsequently, the owner should make any modifications deemed necessary to insure that the facility will function adequately during a PMF event.

b. Enlist the services of a registered professional engineer, experienced in design and construction of earthen embankments, to assess the structural adequacy of the embankment under all possible operating conditions. The seepage and saturated areas should be evaluated to determine what effect, if any, they have on the stability of the structure.

c. Develop a warning system to notify downstream residents should hazardous conditions develop. This should include provisions for round-the-clock surveillance during periods of unusually heavy rainfall.

d. Repair and/or replace the deteriorated portions of the spillway.

APPENDIX A

CHECK LIST - ENGINEERING DATA

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

NAME OF DAM Trout Run Dam (Hillside Run Reservoir)
ID # PA-481; PennDER# 65-78

ITEM	REMARKS	SHEET 1

AS-BUILT DRAWINGS

Available from PennDER.

REGIONAL VICINITY MAP

See USGS 7.5 minute Derry and Wilpen Quadrangles.

CONSTRUCTION HISTORY

Compiled from PennDER files.

TYPICAL SECTIONS OF DAM

See Figures 3, 4, and 5.

OUTLETS - PLAN See Figures 4 and 5.

- DETAILS See Figures 4 and 5.

- DISCHARGE RATINGS None available.

RAINFALL/RESERVOIR RECORDS

None available.

ITEM	REMARKS	ID # PA-481	SHEET 2

DESIGN REPORTS

None available.

GEOLOGY REPORTS

None available.

DESIGN COMPUTATIONS
HYDROLOGY & HYDRAULICS
DAM STABILITY
SEEPAGE STUDIES

None available.

MATERIALS INVESTIGATIONS
BORING RECORDS
LABORATORY
FIELD

Boring records shown on Figure 6 .

POST-CONSTRUCTION SURVEYS OF DAM

None.

BORROW SOURCES

Not known.

ITEM	REMARKS	ID # PA-481	SHEET 3

MONITORING SYSTEMS

None within the embankment. Flow meter on supply line in downstream chlorination building.

MODIFICATIONS

1932 - Placed additional concrete downstream of core wall and initiated a grouting program.
1972 - Replaced gates and stems, stem guides etc. as well as trash screens.
1977 - Minor spillway repairs (minor spillway repair three times in the last nine years.)

HIGH POOL RECORDS

June 1972 - 2-1/2 to 3' of water over spillway (1 ft from top of dam as per caretakers recollection.)

POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS

None available.

Mr. Bailey (Borough Manager) estimated that sedimentation has reduced reservoir capacity from 44×10^6 to 36×10^6 gallons. Significant sedimentation occurred during lumbering operations in watershed during 1972-73.

PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS

Minor damage downstream during Agnes. A small accress bridge to the caretkakers house was lost and some stones were dislodged from the discharge channel sidewalls.

MAINTENANCE OPERATION RECORDS

Daily report issued by full-time caretaker indicating discharge through supply line, chlorination data and weather conditions.

ITEM	REMARKS	ID # PA-481	SHEET 4

SPILLWAY PLAN See Figure 4.

SECTIONS See Figure 4.

DETAILS See Figure 4.

OPERATING EQUIPMENT
PLANS & DETAILS

See Figure 5.

NDI #PA-481

CHECK LIST ID # PennDER #65-78
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: 2.3 sq. mi.

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 1256 (98 acre-feet)

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): Not known.

ELEVATION MAXIMUM DESIGN POOL: Not known.

ELEVATION TOP DAM: 1260 (130 acre-feet)

SPILLWAY DATA:

a. Crest Elevation 1256 ft (MSL) at ogee crest.
b. Type Ogee crested weir.
c. Weir Length 61 ft.
d. Channel Length ≈ 260 ft.
e. Location Spillover Left abutment.
f. Number and Type of Gates None.

OUTLET WORKS:

a. Type 30-inch CIP (blow-off)
b. Location Passes beneath dam left of center and discharges into spillway outlet channel.
c. Entrance Inverts ≈ 1228 ft.
d. Exit Inverts ≈ 1228 ft.
e. Emergency Draindown Facilities Controlled mechanically from within the gate house.

HYDROMETEOROLOGICAL GAGES:

a. Type None.
b. Location N/A
c. Records None available.

MAXIMUM NON-DAMAGING DISCHARGE: 2.5 to 3 ft over spillway crest.

APPENDIX B

CHECK LIST - VISUAL INSPECTION

CHECK LIST
VISUAL INSPECTION
PHASE 1

DAM NAME Hillside Run Dam COUNTY Indiana STATE PA ID # PA-481

TYPE OF DAM Earth HAZARD CATEGORY High PennDER #65-78

DATE(S) INSPECTION 21 September 1978 WEATHER overcast with light rain TEMPERATURE 65 ±

POOL ELEVATION AT TIME OF INSPECTION 1254.5 M.S.L. TAILWATER AT TIME OF INSPECTION N/A M.S.L.

INSPECTION PERSONNEL:

B. Mihalcin	Merle Clawson (Caretaker)	
J. P. Nairn	Arthur Bailey (Borough Manager)	
S. R. Michalski		
D. L. Bonk		

B. Mihalcin RECORDER

EMBANKMENT ID# PA-481 Sheet 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	None observed.	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	None.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	None - Sandstone (slabby, thinly bedded) in both abutments.	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	Vertical - Good. Horizontal - Good.	
RIPRAP FAILURES	None - Riprap is slabby sandstone ≈ 12" deep, hand placed.	

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	Good.	
ANY NOTICEABLE SEEPAGE (see Figure 1)	Seepage areas: (1) Toe of right abutment below the rock drain (small area ≤ 150 ft downstream. (2) Below the toe along the left half of embankment on the flat between dam and spillway channel (small pool at toe.) (3) Adjacent to the spillway wingwall slightly above bench level and below crest level.	
STAFF GAGE AND RECORDER	No Staff gage. Flow meter in gage house ≈ 100 yds downstream of the dam.	
DRAINS	4-inch and 6-inch diameter dtains exit about 50' feet from toe into the downstream channel: (1) 4-inch drain flowing at 6 gpm - mine acid reportedly piped into exit drain. (2) 6-inch drain flowing < 1 gpm.	

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	Cast iron (30-inch ID) blow-off pipe discharges into spillway channel.	
INTAKE STRUCTURE	Intake to 30-inch diameter blow-off pipe is submerged. Upper intake to supply line visible in gate house. Gate house structure in good condition.	
OUTLET STRUCTURE	Blow-off line exits into discharge channel downstream of concrete apron.	
OUTLET CHANNEL	Rock-lined trapezoidal channel below spillway chute. No significant obstructions.	
EMERGENCY GATE	Blow-off pipe valved within gate house. Operated twice a year.	

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	Ogee-shaped concrete weir 61.0 ft in length. Weir is in good condition with joints filled with bitumen.	
APPROACH CHANNEL	Concrete approach - slightly silted.	
DISCHARGE CHANNEL	Concrete chute severely scaled. Displacement (vertical) evident in lower slabs. Few open joints observed. spillway is in need of general resurfacing and repair.	
BRIDGE AND PIERS	Wood bridge located ≈ 150 ft downstream of the spillway which provides access to the caretaker's house.	

GATED SPILLWAY
Not Applicable

ID # PA-481

SHEET 5

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL		
APPROACH CHANNEL		
DISCHARGE CHANNEL		
BRIDGE AND PIERS		
GATES AND OPERATION EQUIPMENT		

VISUAL EXAMINATION	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None.	
OBSERVATION WELLS	None.	
WEIRS	None.	
PIEZOMETERS	None.	
OTHERS	Several old grout pipes evident in the embankment.	

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Steep, heavily wooded, no signs of instability.	
SEDIMENTATION	Not visible but manager estimates ≈ 8 mg storage capacity lost due to siltation.	

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Rock lined channel just downstream of spillway empties in to the natural Trout Run channel ≈ 100 feet downstream of the dam. The stream passes beneath at least seven bridges before entering McGee Run approximately one mile downstream of the dam.	
SLOPES	Below the dam for a distance of approximately 3000 feet. The valley slopes are wooded and moderate to steep. Beyond this point Trout Run enters the broad valley to the west of Chestnut Ridge.	
APPROXIMATE NO. OF HOMES AND POPULATION	At least one dozen homes in the community of Hillside are located in such a position that they could be effected by failure of Trout Run Dam. Population affected - 50.	

APPENDIX C

HYDRAULICS AND HYDROLOGY CALCULATIONS

SUBJECT DAM SAFETY INSPECTION
TROUT RUN DAM

BY DLB DATE 9-22-78 PROJ. NO. 78-501-481

CHKD. BY _____ DATE 10-23-78 SHEET NO. 1 OF 9

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DAM STATISTICS

MAXIMUM HEIGHT - 41 FT. (FIELD MEASURED)

DRAINAGE AREA - 2.3 SQ. MI. (PLANIMETERED OFF U.S.G.S. 7.5 MINUTE MAP QUADRANGLES)

STORAGE CAPACITY
@ SPILLWAY CREST (EL 1256)' ≃ 98 ACRE FT. (FIG 1 ; APPENDIX F)
@ TOP OF DAM (EL 1260)' ≃ 130 ACRE FT. (SHEET 8)

SIZE CLASSIFICATION

DAM SIZE - INTERMEDIATE (REF 2 ; TABLE 1)

HAZARD RATING - HIGH (FIELD OBSERVATION)

REQUIRED SDF - PMF (REF 2 ; TABLE 3)

REFERENCES

1: "WATER RESOURCES BULLETIN, DAMS, RESERVOIRS, AND LAKES" PENNA. DEPT. OF FORESTS AND WATERS ; BULLETIN NO. 5, COMPREHENSIVE WATER RESOURCES PLANNING INVENTORY NO. 1, 1970

2: "RECOMMENDED GUIDELINES FOR SAFETY INSPECTION OF DAMS" DEPT. OF THE ARMY - OFFICE OF CHEIF ENGINEER, APPENDIX D

3: STANDARD HANDBOOK FOR CIVIL ENGINEERS F. S. MERRITT, MCGRAW-HILL 1976

SUBJECT DAM SAFETY INSPECTION
TROUT RUN DAM

BY DLB DATE 9-22-78 PROJ. NO. 78-501-481

CHKD. BY _____ DATE 10-23-78 SHEET NO. 2 OF 9

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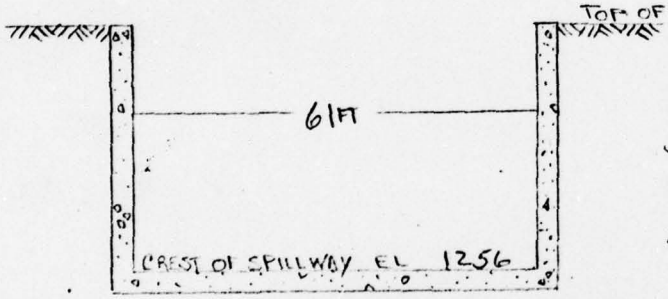
PMF (PEAK FLOW)/AREA = 1890 CFS/SQ. MI. (C OF E CURVE, OHIO RIVER BASIN)

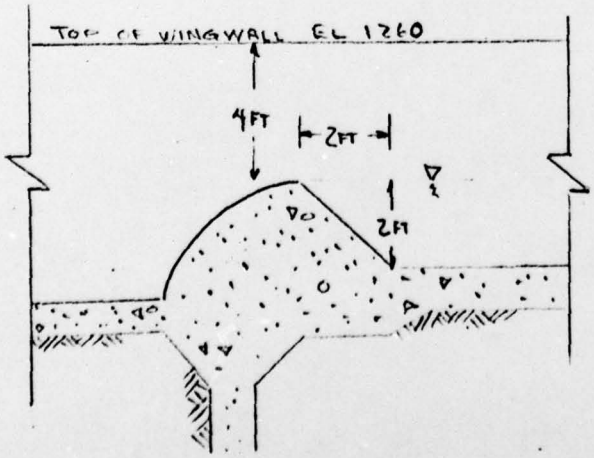
PMF = (1890 CFS/SQ. MI.)(2.3 SQ. MI.) = 4347 CFS

PEAK PMF Q = 4347 CFS

SPILLWAY CAPACITY



ASSUME MINOR CREST SETTLEMENTS RESTORED TO PROPER GRADE (MAXIMUM MEASURED SETTLEMENT EQUALS 0.1 FEET)



ALL ELEVATIONS ARE TAKEN FROM DRAWING SHEET NO. 5-B TITLED "HILLSIDE RUN WATER SUPPLY, DETAIL PLANS OF SPILLWAY", DATED APRIL 21, 1927. DIMENSIONS HAVE BEEN FIELD VERIFIED

SUBJECT DAM SAFETY INSPECTION
TROUT RUN DAM

BY DLB DATE 9-22-78 PROJ. NO. 78-501-481

CHKD. BY _____ DATE 10-23-78 SHEET NO. 3 OF 9

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$Q = CLH^{3/2}$ (REF 3: EQ 21-121)

L = LENGTH OF SPILLWAY CREST = 61FT (SHEET 2)
H = MAXIMUM HEAD OVER SPILLWAY CREST = 4FT "

C = COEFFICIENT OF DISCHARGE

(FROM REF 3: FIGURE 21-69)

P/Hd = FOREBAY DEPTH / MAXIMUM HEAD

= 2FT/4FT = 0.5 (SHEET 2)

APPROACH SLOPE OF WEIR EQUALS 1H : 1V "

$\frac{C_{INCLINED}}{C_{VERTICAL}} \simeq 1.01$

(FROM REF 3: FIGURE 21-67)

$C_{VERTICAL} \simeq 3.8$

$C_{INCLINED} \simeq (1.01)(3.8) \simeq 3.84$

$Q \simeq (3.84)(61)(4)^{3/2} \simeq 1874$ CFS

PEAK PMF Q (4347 CFS) > MAXIMUM DISCHARGE (1874 CFS)

SUBJECT DAM SAFETY INSPECTION
TROUT RUN DAM

BY DLB DATE 9-25-78 PROJ. NO. 78-501-481

CHKD. BY _____ DATE 10-23-78 SHEET NO. 4 OF 9

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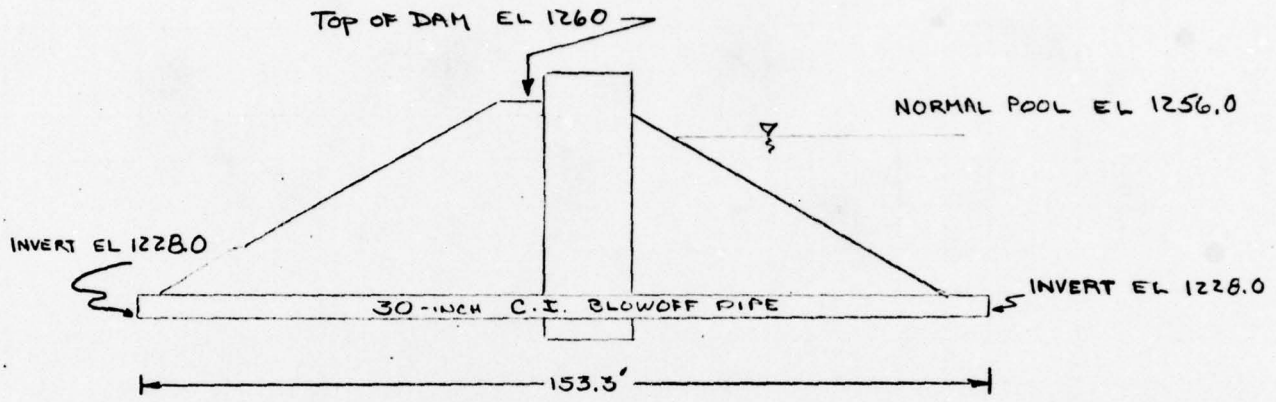
OUTLET WORKS (30-INCH DIAMETER BLOW-OFF)



(NOT TO SCALE)

NOTE: THE ABOVE FIGURE IS BASED ON THE DESIGN DRAWING TITLED "HILLSIDE RUN WATER SUPPLY, SECTION THROUGH DAM AND GATE HOUSE, ETC." DATED JUNE 22, 1926, SHEET 4-A

USE BERNOULLI'S EQUATION (REF 3, EQ 21-12)

$$Z_1 + P_1/\omega + V_1^2/2g = Z_2 + P_2/\omega + V_2^2/2g + h_f + h_e$$

FOR 30" C.I.P (UNDER MAXIMUM POOL CONDITIONS)

Z_1 = HEIGHT OF INLET ABOVE DATUM = 0
Z_2 = " " OUTLET " " = 0
P_1/ω = PRESSURE HEAD AT INLET = 28 FT
P_2/ω = PRESSURE HEAD AT OUTLET = 0
V_1 = VELOCITY AT INLET = 0
V_2 = " " OUTLET = SOLVE FOR
g = GRAVITATIONAL CONSTANT = 32.2 FT/SEC^2

SUBJECT DAM SAFETY INSPECTION
TROUT RUN DAM

BY DLB DATE 9-25-78 PROJ. NO. 78-501-481

CHKD. BY _____ DATE 10-23-78 SHEET NO. 5 OF 9

h_f = HEAD LOSS DUE TO FRICTION

$$h_f = f \frac{LV^2}{2gD}$$ (REF 3: EQ 21-30)

L = LENGTH OF PIPE = 153.3'
D = DIAMETER OF PIPE = 2.5'

f = FRICTION FACTOR - BASED ON TURBULENT FLOW WITH AN ASSUMED REYNOLD'S NUMBER = 1.0×10^7 AND A COEFFICIENT OF ROUGHNESS FOR C.I.P. $\epsilon = 0.00085$ (REF 3; TABLE 21-3

$f = 0.017$ (REF 3: FIG 21-19)

h_e = HEAD LOSS AT INLET

$$h_e = K_E \frac{V^2}{2g}$$ (REF 3: EQ 21-42)

K_E = COEFFICIENT OF FRICTION = 0.50 (REF 3: TABLE 21-7)

SOLVE BERNOULLI'S EQUATION

$$0 + 28' + 0 = 0 + 0 + \frac{V_2^2}{2(32.2)} + \frac{(0.017)(153.3)V_2^2}{(2)(32.2)(2.5)} + \frac{(0.5)V_2^2}{(2)(32.2)}$$

$$28' = (0.016 + 0.016 + 0.008)V_2^2$$

SUBJECT DAM SAFETY INSPECTION
TROUT RUN DAM

BY DLB DATE 9-25-78 PROJ. NO. 78-501-481

CHKD. BY _____ DATE 10-23-78 SHEET NO. 6 OF 9

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$28'/0.04 = V_2^2$

$V_2 = 26.5$ FT/SEC

$Q = VA = (26.5 FT/SEC)(\pi)(1.25 FT)^2$

$Q = 130$ CFS

TOTAL DISCHARGE (SPILLWAY AND BLOW-OFF) = 1874 CFS + 130 CFS

= 2004 CFS

PEAK PMF Q (4347 CFS) > MAXIMUM TOTAL DISCHARGE (2004 CFS)

SUBJECT DAM SAFETY INSPECTION
TROUT RUN DAM

BY DLB DATE 9-22-78 PROJ. NO. 78-501-401

CHKD. BY _____ DATE 10-23-78 SHEET NO. 7 OF 9

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CONSIDER INFLOW RELATIVE TO BOTH OUTFLOW AND STORAGE USING THE SHORT CUT METHOD AS RECOMMENDED BY NAD

$P = \frac{\text{MAXIMUM DISCHARGE}}{\text{PEAK PMF Q}} = \frac{2004\ \text{CFS}}{4347\ \text{CFS}}$ (SHEET 6) (SHEET 2)

$P = 0.46$

$(1-P) = \frac{\text{REQUIRED RESERVOIR STORAGE}}{\text{INFLOW VOLUME}} = (1-0.46) = 0.54$

INFLOW VOLUME

$V = \frac{1}{2}(Q_{IMAX})(\text{TIME})$

DURATION TIME = 34 HRS (REF: C OF E CURVE, OHIO RIVER BASIN)

$V = \frac{1}{2}(4347\ \text{CFS})(34\ \text{HRS})(3600\ \text{SEC/HR})(1\ \text{ACRE}/43{,}560\ \text{SQ.FT.}) =$

$= 6107\ \text{AC-FT}$

DETERMINE THE AVERAGE RUNOFF REQUIRED TO PRODUCE THE ABOVE VOLUME OF INFLOW

$(6107\ \text{AC-FT})(1\ \text{SQ.MI}/640\ \text{ACRES})(12\ \text{IN/FT})/(2.3\ \text{SQ.MI.}) = 49.8\ \text{INCHES}$

VOLUMES PRODUCED BY RUNOFF IN EXCESS OF 26 INCHES ARE TO BE RECALCULATED USING 26 INCHES AS AN UPPER BOUND.

$(26\ \text{INCHES})(2.3\ \text{SQ.MI.})(640\ \text{ACRES/SQ.MI.})(1\ \text{FT}/12\ \text{IN}) = 3189\ \text{AC-FT}$

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VOLUME OF INFLOW (RECALCULATED) = 3189 AC-FT

NOTE: $Q_{I\,MAX}$ REMAINS CONSTANT.
DURATION TIME DECREASES IN ACCORDANCE WITH THE DECREASE IN INFLOW VOLUME.

$$\text{EQUIVALENT DURATION TIME} = \frac{(3189\,\text{AC-FT})(2)(43{,}560\,\text{SQ.FT/ACRE})}{(4{,}347\,\text{CFS})(3600\,\text{SEC/HR})} =$$

$$= 17.8\,\text{HRS}$$

(1-P)(INFLOW VOLUME) = REQUIRED STORAGE

REQUIRED STORAGE = (0.54)(3189 AC-FT) = 1722 AC-FT

AVAILABLE STORAGE

RESERVOIR SURFACE AREA (@ NORMAL POOL EL 1256) = 8 ACRES (FIG. 1 ; APPENDIX F)

AVAILABLE FREEBOARD = 4FT (SHEET 2)

STORAGE AVAILABLE = 4FT (8 ACRES) = 32 AC-FT

REQUIRED STORAGE (1722 AC-FT) > AVAILABLE STORAGE (32 AC-FT)

ESTABLISH WHAT PERCENT PMF IS PASSED AND/OR CONTAINED BASED ON THE ASSUMPTIONS AND CRITERIA FROM PAGES 1 TO 4.

$$(1-P) = \frac{\text{AVAILABLE STORAGE}}{\text{INFLOW VOLUME}} = \frac{32\,\text{AC-FT}}{(1/2)(Q_{3\,MAX})(17.8\,\text{HRS})(3600\,\text{SEC/HR})(1\,\text{ACRE}/43{,}560\,\text{FT}^2)}$$

SUBJECT DAM SAFETY INSPECTION
TROUT RUN DAM

BY DLB DATE 9-25-78 PROJ. NO. 78-501-481

CHKD. BY _____ DATE 10-23-78 SHEET NO. 9 OF 9

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(SHEET 4)

$$P = \frac{\text{MAXIMUM DISCHARGE}}{\text{PEAK PMF Q}} = \frac{2004 \text{ CFS}}{Q_{IMAX}}$$

$$\therefore \quad 1 - \frac{2004}{Q_{IMAX}} = \frac{32}{0.74\, Q_{IMAX}}$$

$$0.74\, Q_{IMAX} - 1483 = 32$$

$$0.74\, Q_{IMAX} = 1515$$

$$Q_{IMAX} = 2047 \text{ CFS}$$

$$\text{PEAK PMF Q} = 4347 \text{ CFS}$$

$$Q_{IMAX} = 47\% \text{ PEAK PMF Q}$$

APPENDIX D

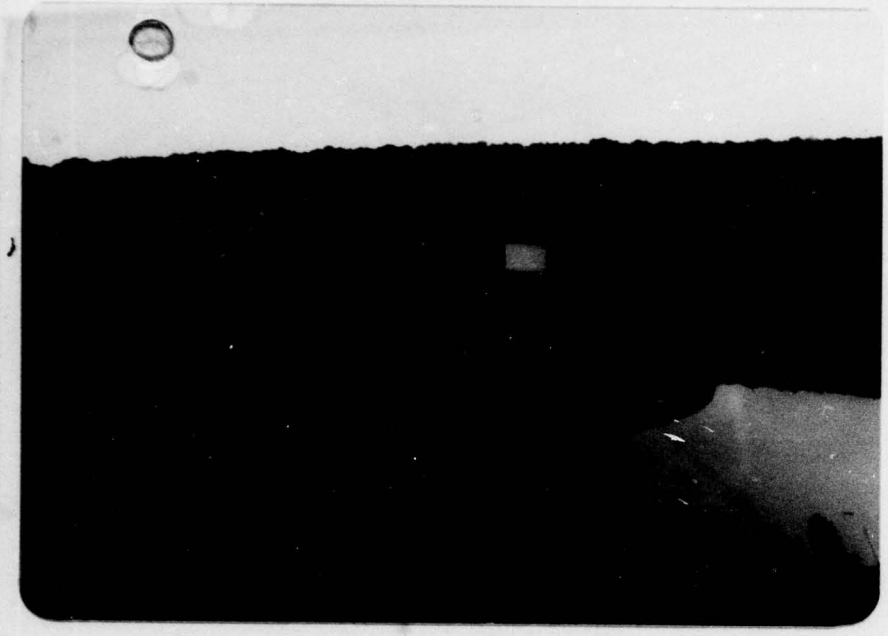
PHOTOGRAPHS

PHOTOGRAPH 1 View looking north over the spillway section and along the centerline of the embankment. The valve house is situated within the embankment.

PHOTOGRAPH 2 Detailed view showing the spillway channel and the broad-crested weir in the control section of the spillway.

PHOTOGRAPH 3 View looking down the spillway chute immediately below the spillway weir. The structures in the background are occupied by the dam caretaker and his family.

PHOTOGRAPH 4 View is looking northeast at the reservoir and the watershed area. The pipes in the foreground are remnents of a grouting program conducted circa, 1935.



1

2

3

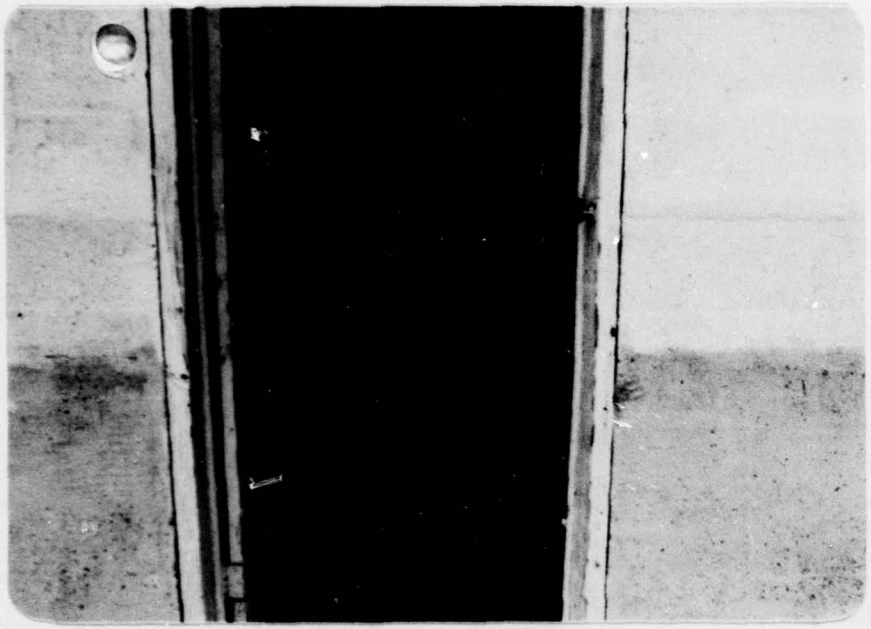
4

PHOTOGRAPH 5 View of the interior of the gate house.

PHOTOGRAPH 6 View showing the Trout Run channel immediately below the spillway chute. Note the 30-inch diameter blow-off pipe at the end of the chute. The acid mine drainage detailed in Photographs 7 and 8 can be seen in the lower left corner of the picture.

PHOTOGRAPH 7 View showing 4-inch diameter cast iron pipe (left) and a 6-inch diameter terra cotta pipe (TCP)(center) which exit into the discharge channel just downstream of the dam. Flow from the TCP is apparently fed from a small pool at the toe of the dam (behind shrubs in background.)

PHOTOGRAPH 8 Detailed view showing discharge from the 4-inch diameter cast iron pipe shown in the previous view. This discharge reportedly originated at a deep mine located above the embankment on the left abutment.



5

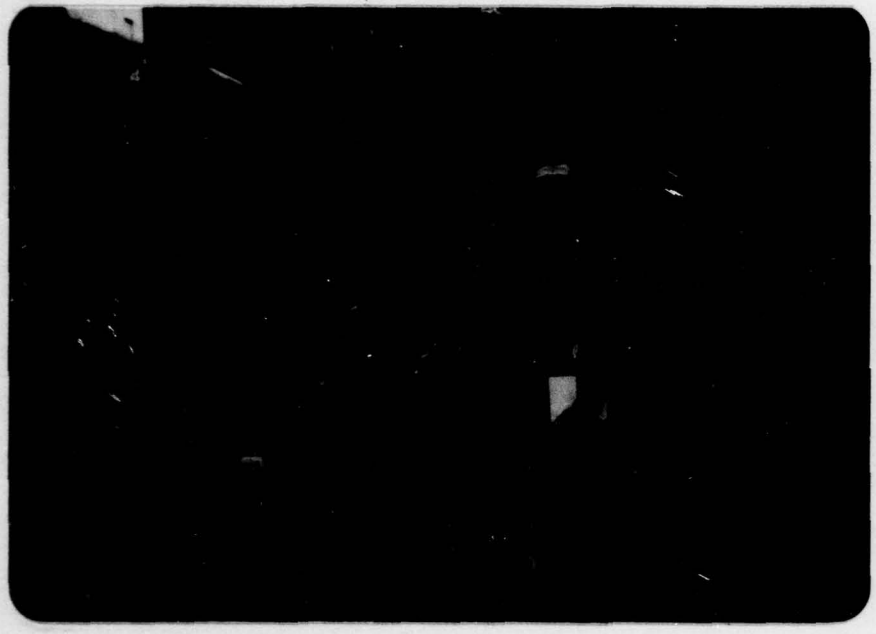
6

7

8

PHOTOGRAPH 9 View showing the small pool at the toe of the dam.

PHOTOGRAPH 10 View looking west (downstream) along the Trout Run channel. This view is taken from the parking lot of the caretaker's house.



9

10

APPENDIX E

GEOLOGY

GEOLOGY

Trout Run Dam is located in the Allegheny Mountain Section, Physiographic Province of Pennsylvania, on the western flank of the Chestnut Ridge Anticline.

The rock strata below the dam are predominantly sandstones and conglomerates of the Pennsylvania age, Pottsville formation. The rock units which crop out in the valley walls and immediately above the dam are characterized as interbedded shales and sandstones of the Allegheny Formation. Detailed boring logs, depicting subsurface conditions at the site, are shown on Figure 5.

The rock units in the Trout Run Dam vicinity dip to the northwest approximately 850 ft per mile (≈9°). Locally the dip may more closely approach 15° as evidenced by the cross section shown on Figure 5. In any event, the geologic conditions at the site would be ideal to promote migration of water to the northwest along bedding joints in the broken sandstone unit that crops out on the left abutment.

APPENDIX F

FIGURES

TABLE OF CONTENTS

Figure	Description/Title
1	Sketch - Trout Run Dam
2	Plan of Dam
3	Typical Section and Profile of Dam
4	Detail Plans of Spillway
5	Section Through Dam at Gate House, etc.
6	Test Holes Along Proposed Core Wall No. 1

SUBJECT SKETCH - TROUT RUN DAM

BY SRH/JPN DATE 10-12-78 PROJ. NO. 78-501-481

CHKD. BY JJN DATE 11-10-78 SHEET NO. 1 OF 1

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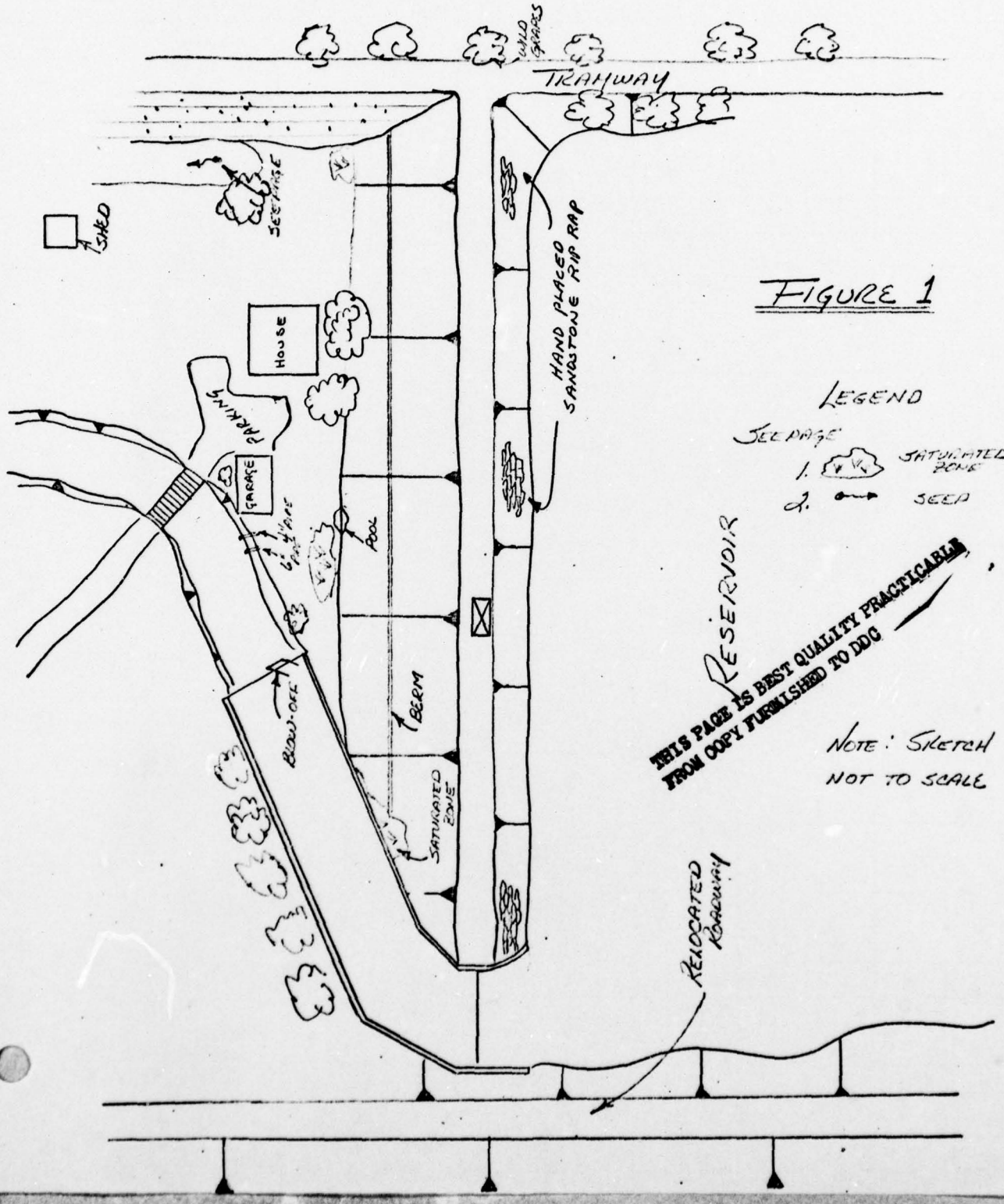
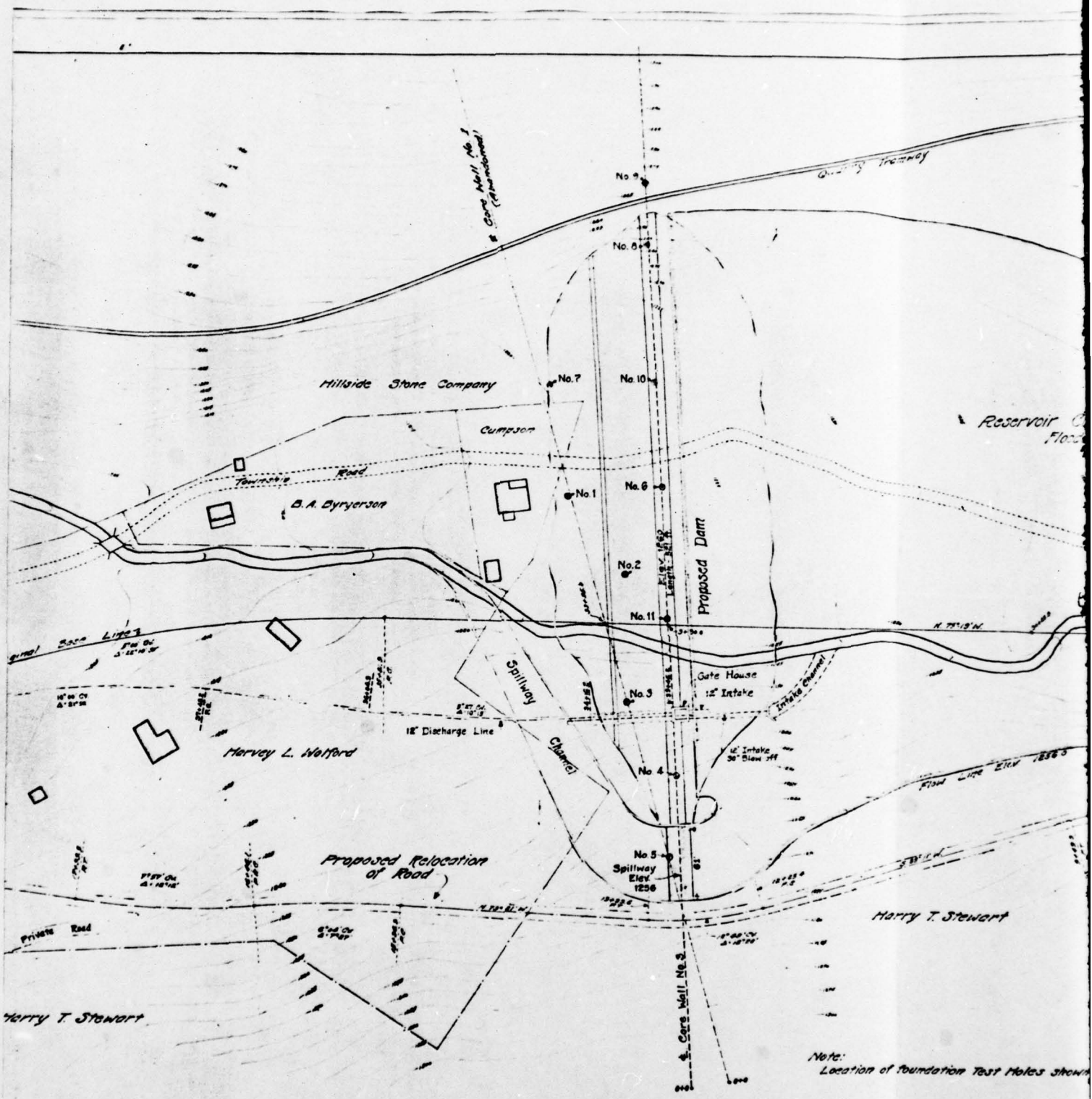
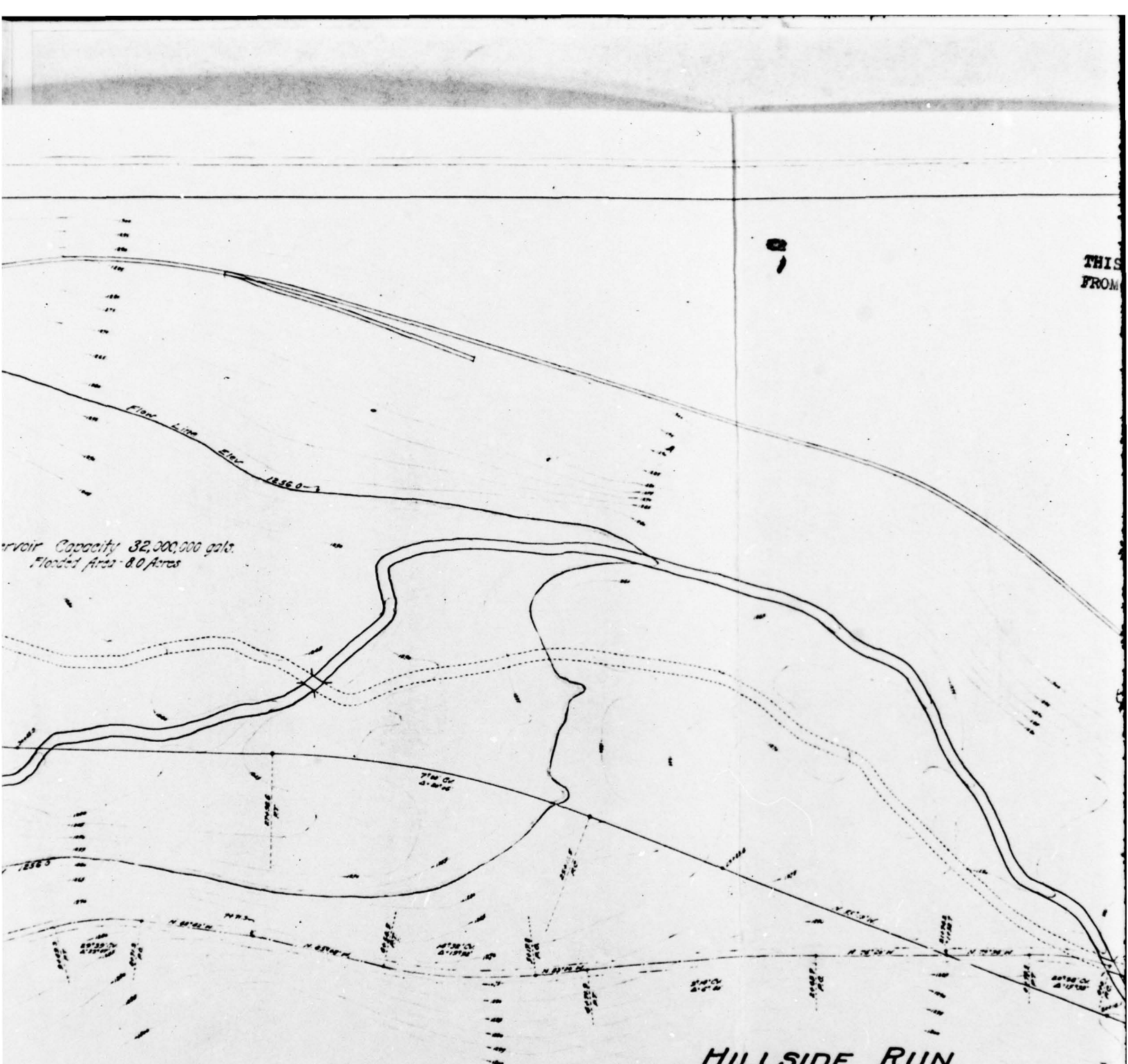


FIGURE 1

NOTE: SKETCH NOT TO SCALE





HILLSIDE RUN
Water Supply
In Derry Twp., Westmoreland Co.
FOR
BLAIRSVILLE BOROUGH
Indiana County
Map showing revised location of Reservoir, Spillway, relocation of Township Road and Test Holes.
Scale: 1" = 50' June 22, 1926
T. C. North
Borough Manager

oles shown thus No.0

Sheet No. 19

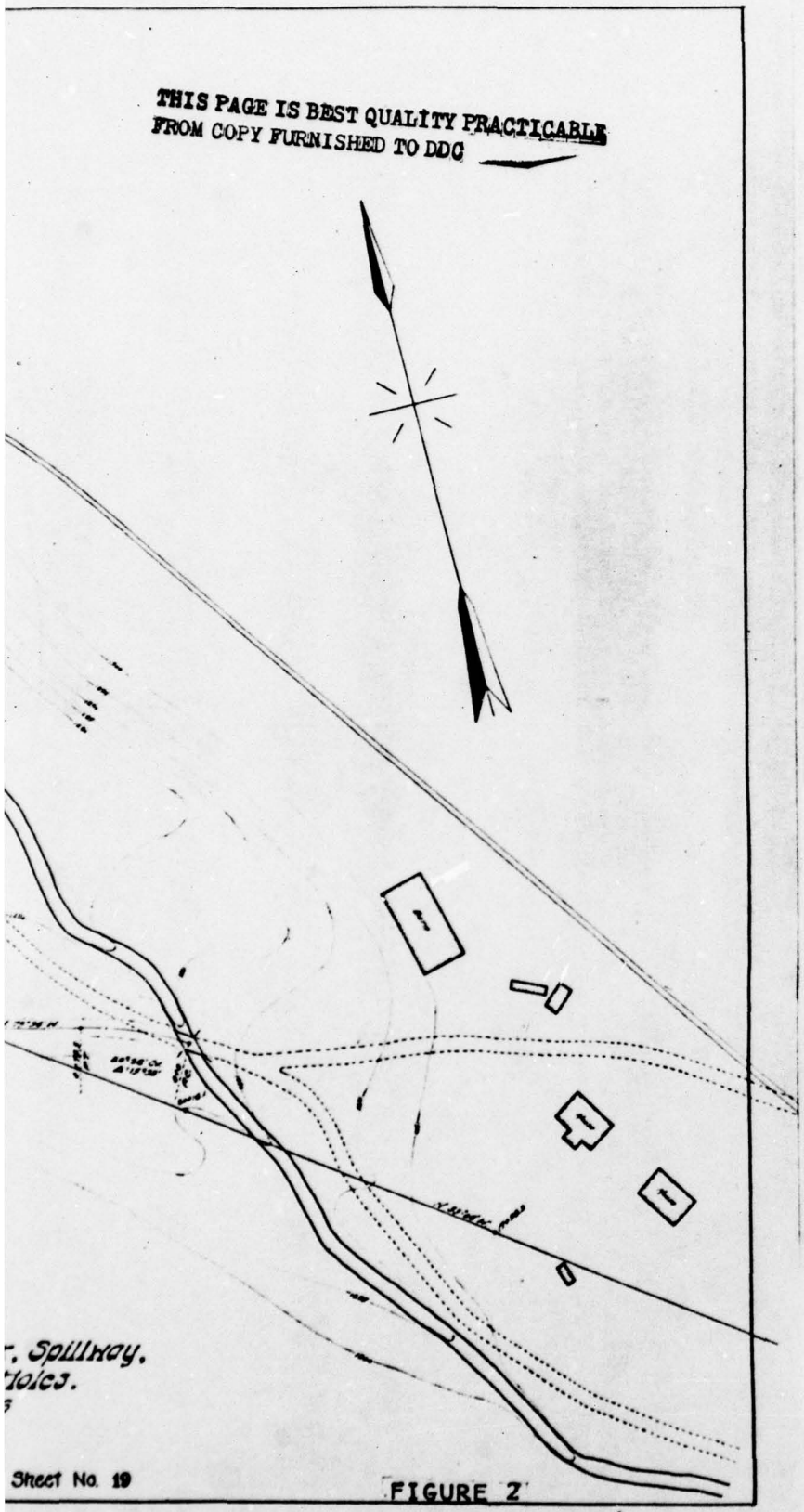
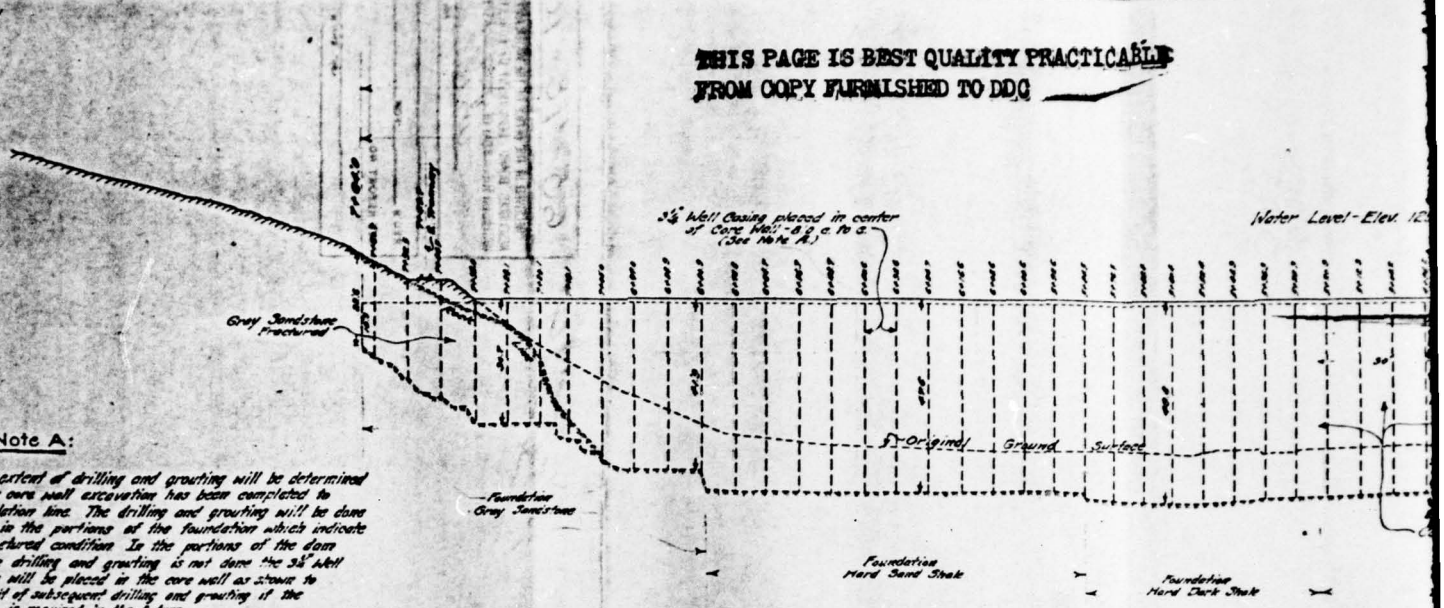


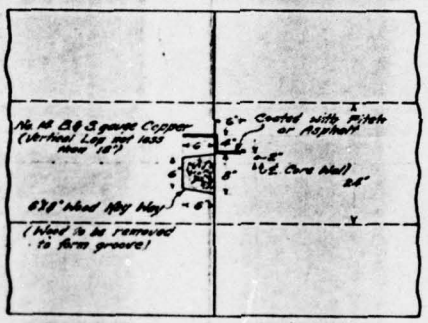
FIGURE 2



Note A:

The extent of drilling and grouting will be determined after core wall excavation has been completed to foundation line. The drilling and grouting will be done only in the portions of the foundation which indicate a fractured condition. In the portions of the dam where drilling and grouting is not done the 3½" Well casing will be placed in the core wall as shown to permit of subsequent drilling and grouting if the same is required in the future.

Note: No drilling or grouting was done and 3½" Well Casing was placed for full length of Core Wall to foundation line as shown.

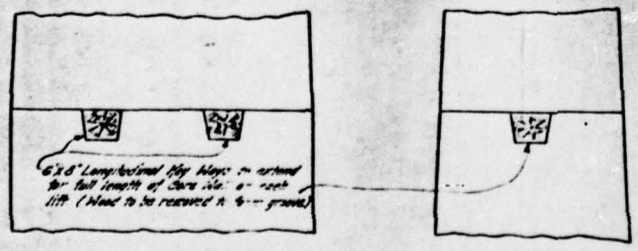


Note:
See detail plans of special construction of 20 ft. section of Core Wall opposite Gate House Sta. 3+22.7 to Sta. 3+42.7

Plan of Vertical Core Wall Joint

Core Wall constructed in 30 ft. Sections, 12 ft. Lifts and keyed as shown.

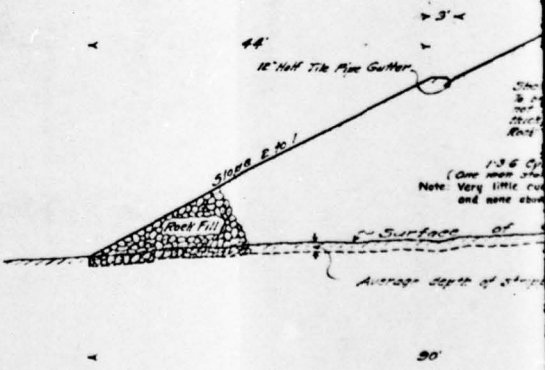
Scale: ¾" = 1'



Horizontal Construction Joint

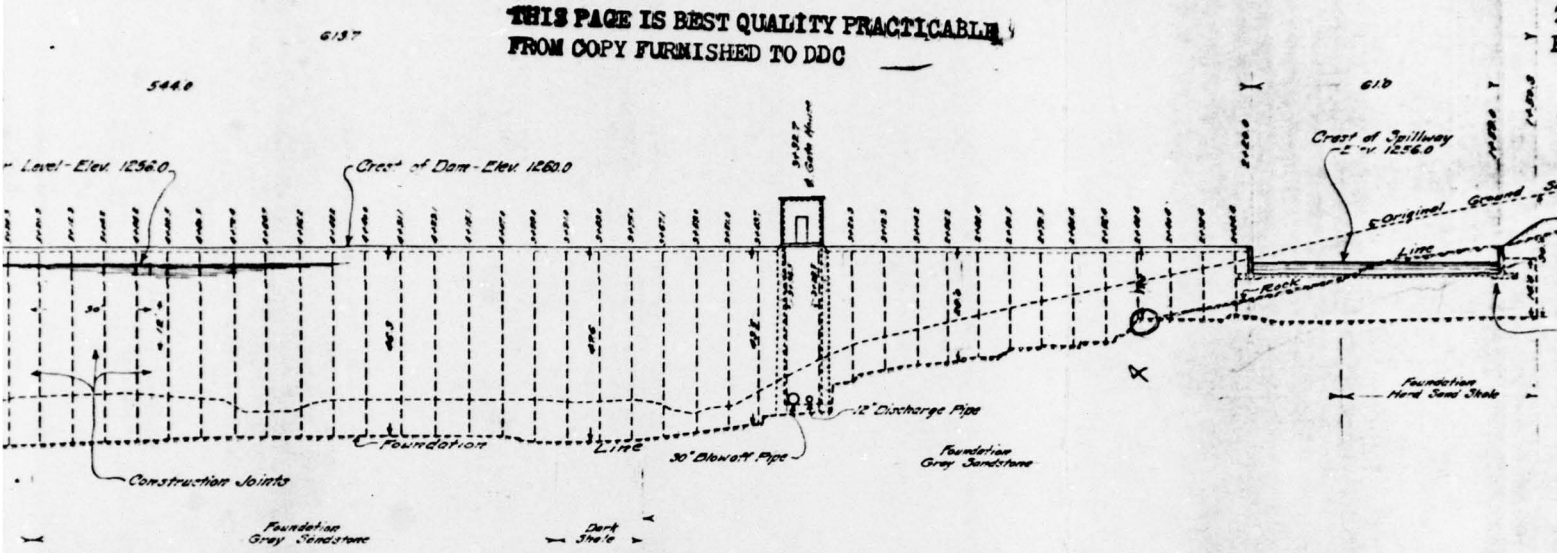
Sections showing method of keying horizontal construction joints in Core Wall.

Scale: ¾" = 1'



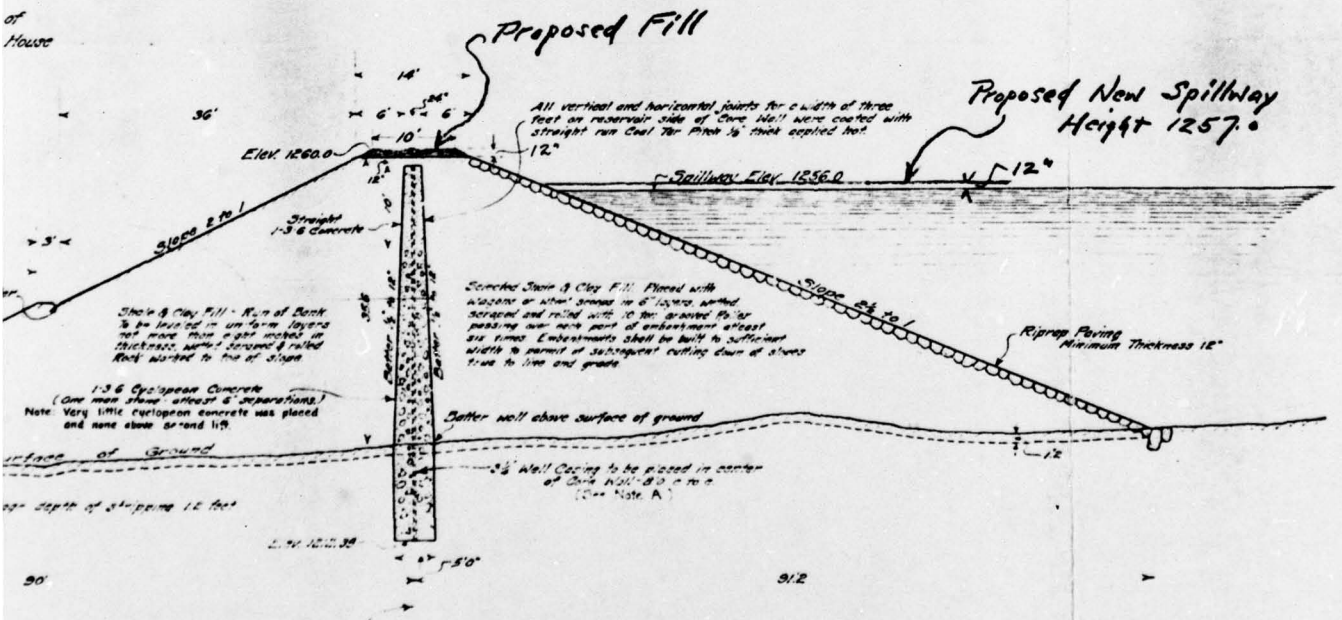
Note: The upper 12" of [illegible] Embankment to be [illegible] with selected [illegible] and covering with suitable fertilizer and sown with grass seed

(The covering with fertilizer and the sowing with grass seed is not included in the Reservoir Contract.)



Profile on ℄ of Core Wall

Scale: 1" = 20'



Section Through Dam

Showing Typical Section

Sta 5+0 Scale: 1" = 10'

AS CONSTRUCTED

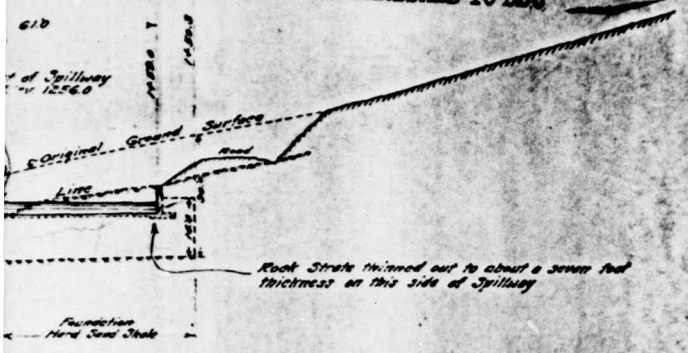
Note: ... embankments to be ... 1" and larger, and ... of atleast 12" below ... sticks and top-soil ... more, as instructed. ... be cleared and scra... placed in embankmen... foreign matter. The so... easing are not to be ... wall foundation, very ... used and work done ... shattering of the roc...

HILL
Wo
In Derry

BLAIRSVI
Ind

Typical Sectio
Scales As shown

T.C. North
Borough E



Note: Surface of ground within limits of embankments to be cleared of all brush and trees, Roots 1" and larger, and all stumps to be grubbed out to depth of atleast 12" below surface. The top layer of leaves, sticks and top-soil to be scraped off for a depth of 12" or more, as instructed. The surface of all borrow pits must be cleared and scraped in a similar manner and material placed in embankments must be free from roots or other foreign matter. The surfaces of concrete core wall and pipe casing are not to be rubbed. If blasting is required for core wall foundation, very light charges of explosives must be used and work done with extreme care to prevent shattering of the rock in sides and bottom.

HILLSIDE RUN
Water Supply

In Derry Twp. Westmoreland Co.

FOR

BLAIRSVILLE BOROUGH

Indiana County

Typical Section & Profile of Dam

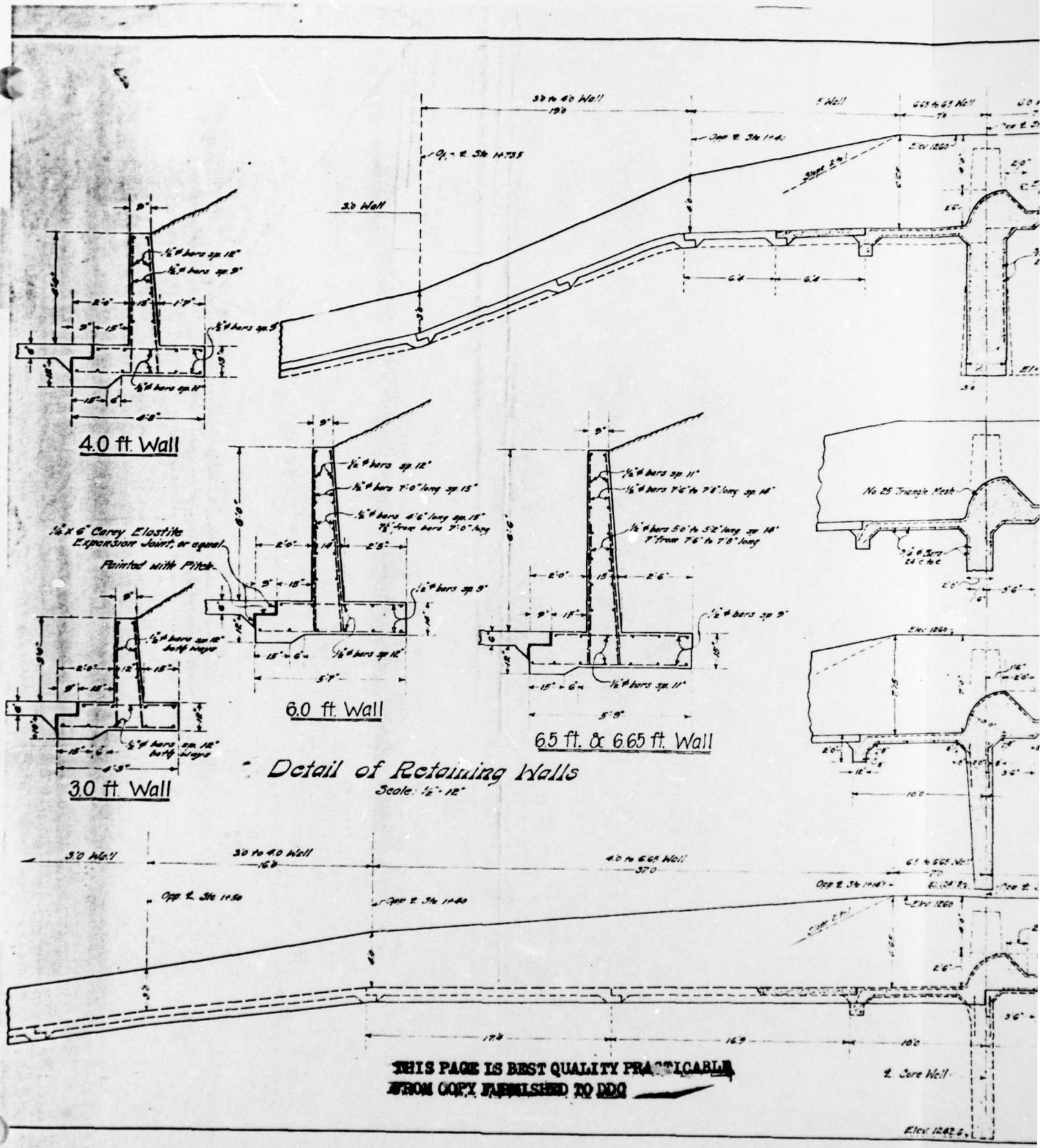
Scales: As shown

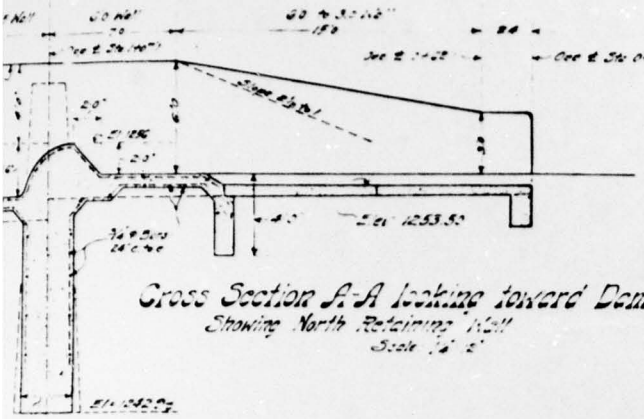
May 4, 1928
Superseding Sheet No. 3 - Jan. 1, 1926
and Sheet No. 3-A - June 22, 1926

T. C. North
Borough Manager

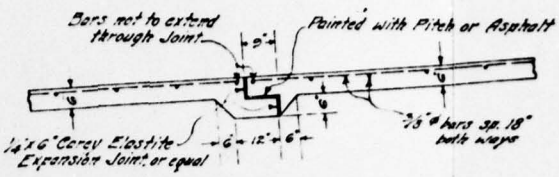
FIGURE 3

Sheet No. 3-B

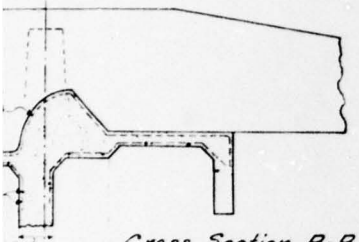




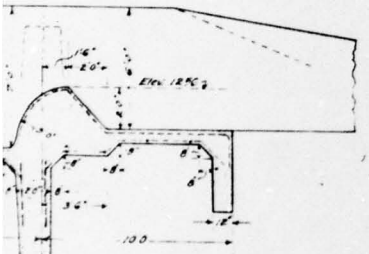
Cross Section A-A looking toward Dam
Showing North Retaining Wall
Scale: 1/4" = 1'



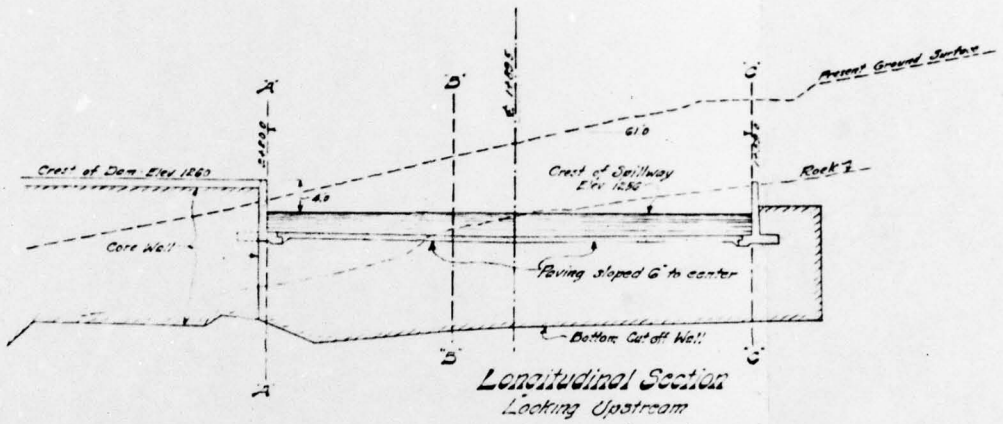
Detail of Floor Joint
Scale: 1/2" = 1'



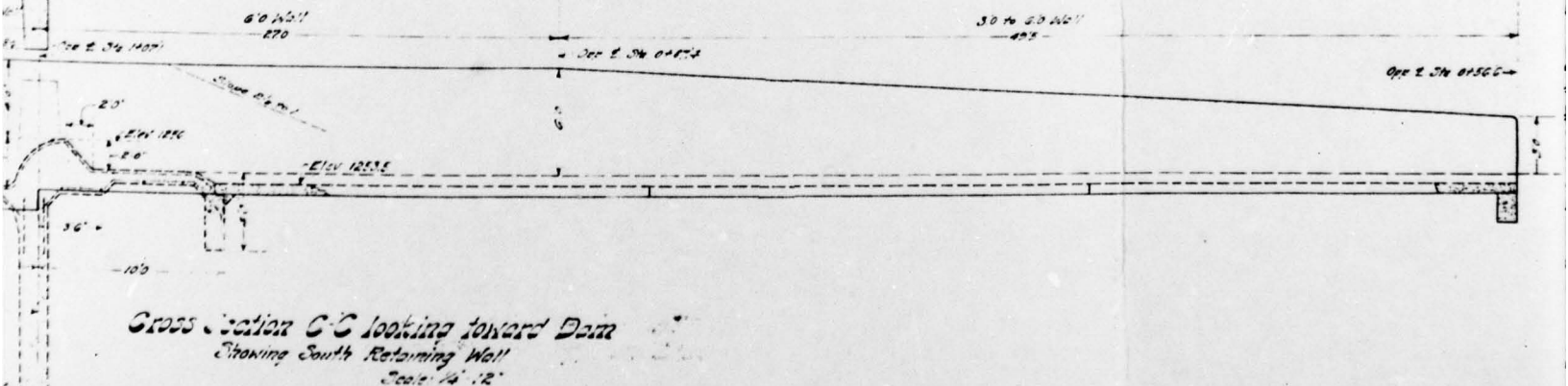
Cross Section B-B



Cross Section on ℄.



Longitudinal Section
Looking Upstream
Scale: 1" = 10'



Cross Section C-C looking toward Dam
Showing South Retaining Wall
Scale: 1/4" = 1'

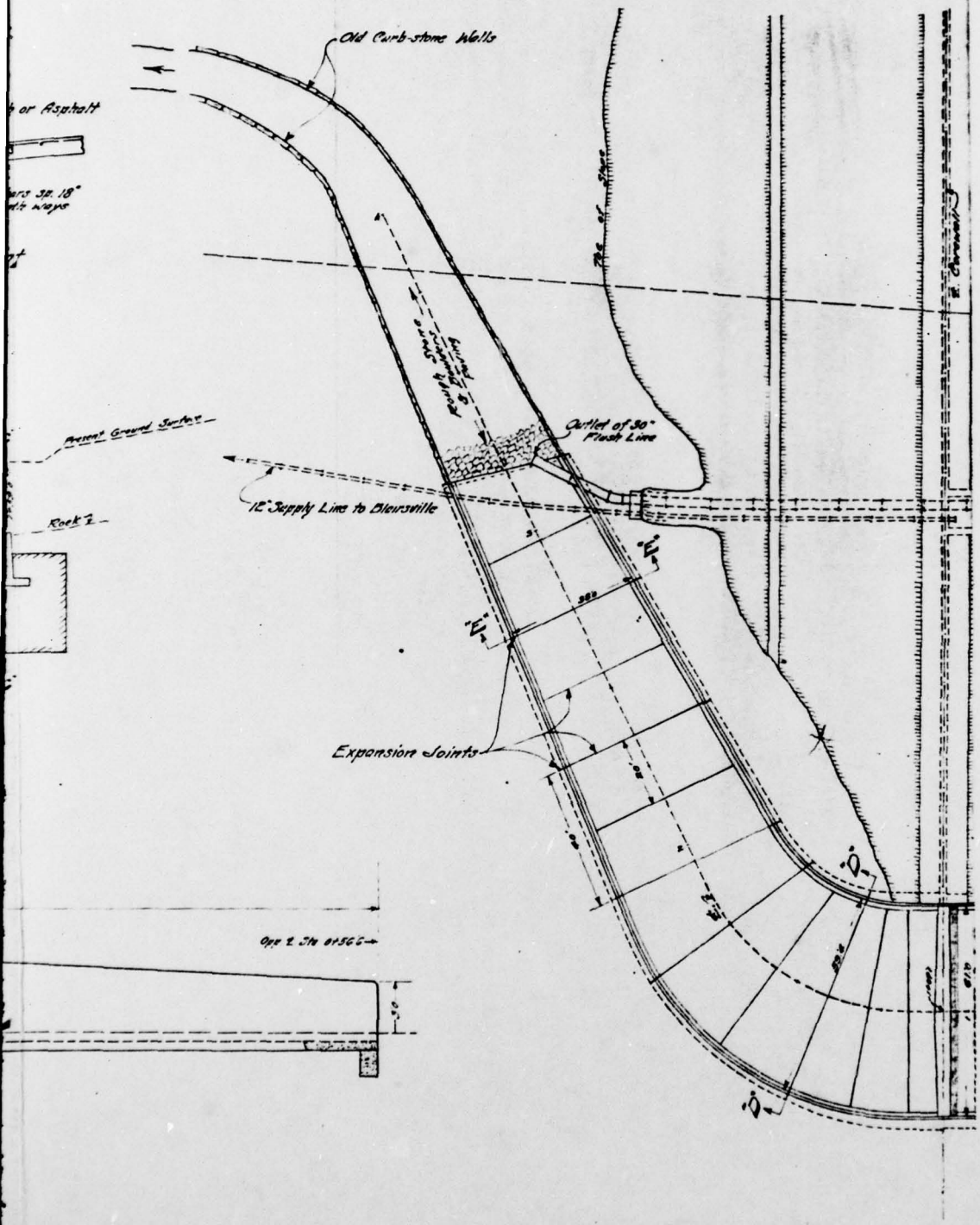
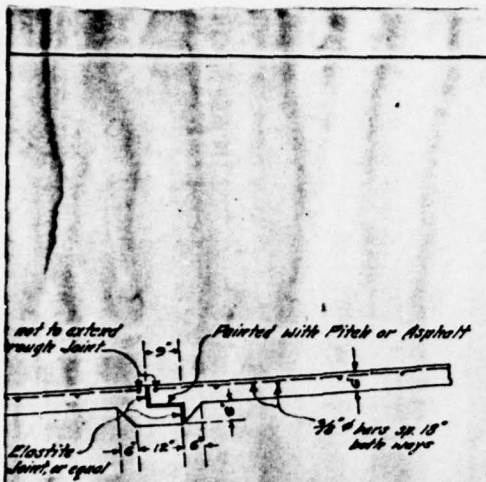
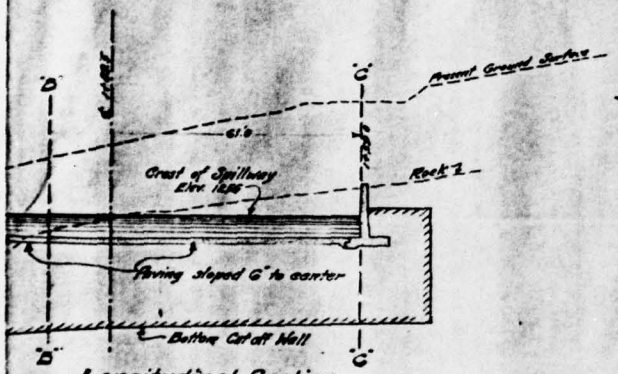
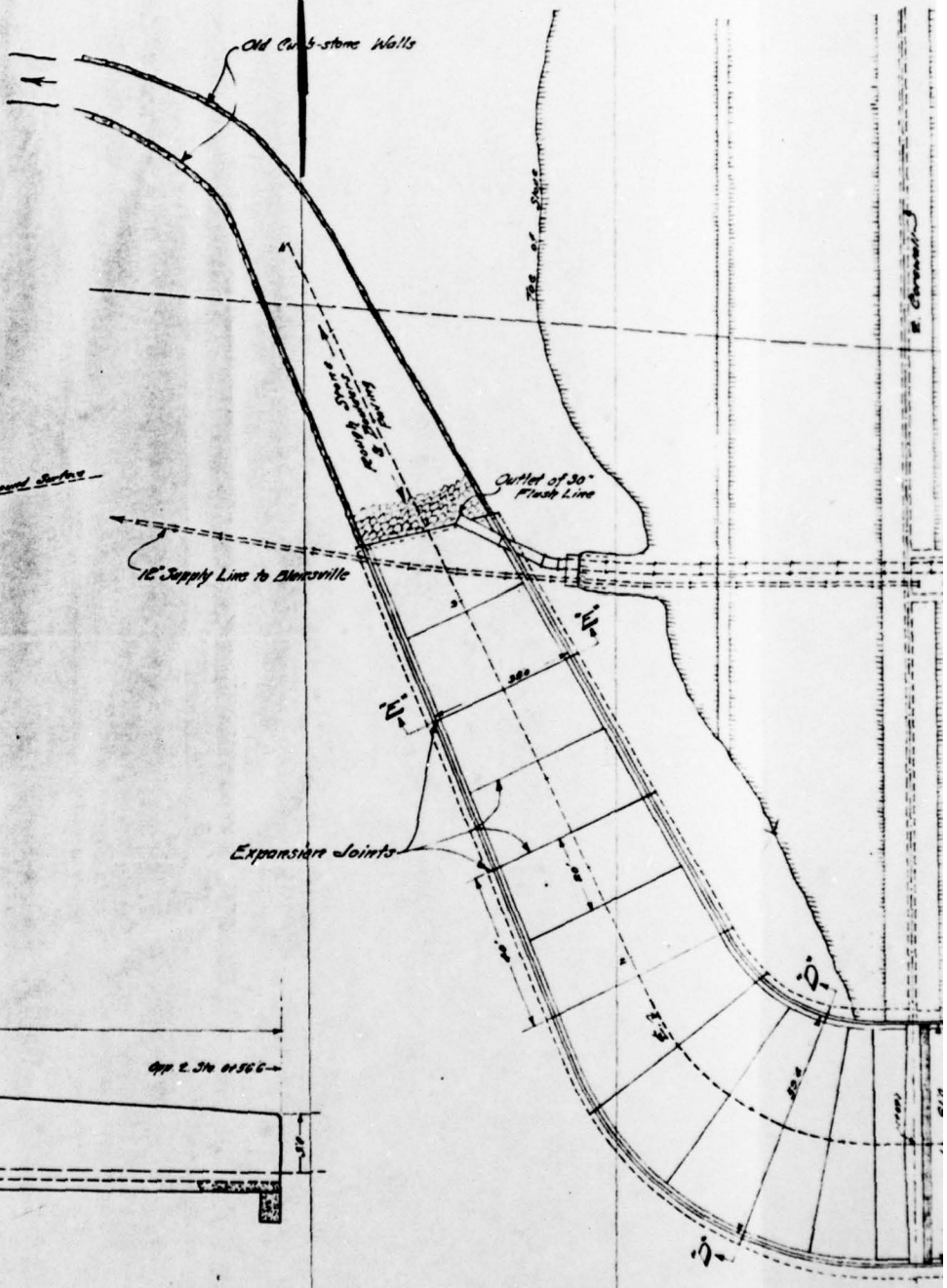
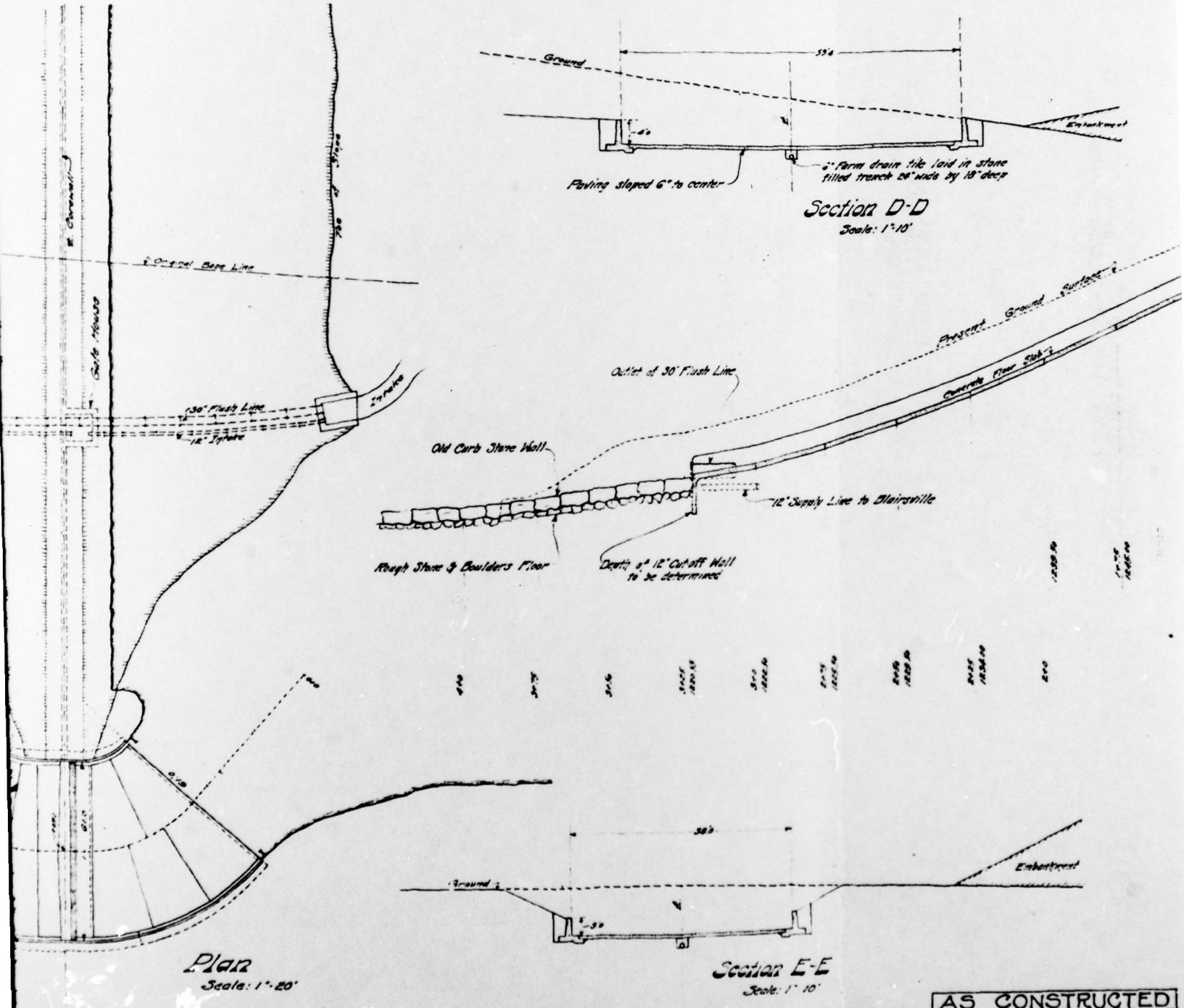


FIGURE 4 (1 of 2)

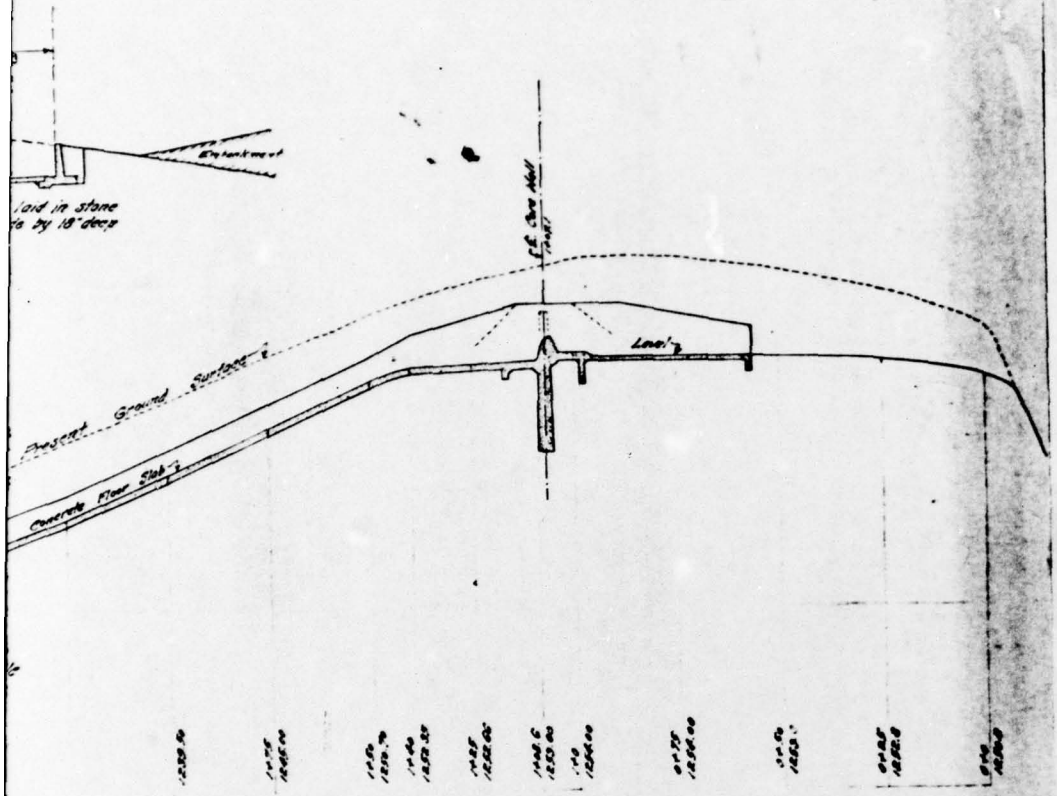






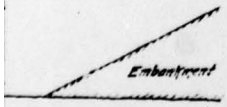


AS CONSTRUCTED



Profile on ℄ of Spillway

Scales: Hor. 1"=10'
Ver. 1"=10'



HILLSIDE RUN
Water Supply
In Derry Twp., Westmoreland Co.
FOR
BLAIRSVILLE BOROUGH
Indiana County

Detail Plans of Spillway

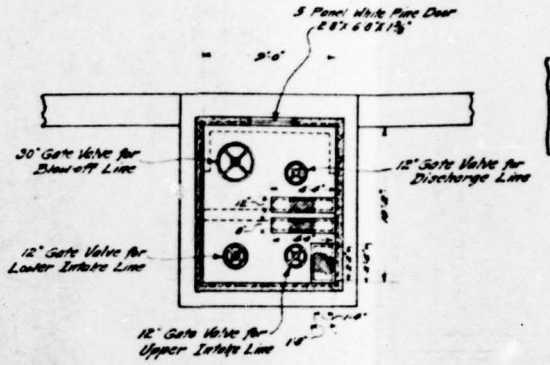
Scales: As shown Apr. 21, 1927

Superseding
Sheet No. 5-A, June 22, 1925
Sheet No. 5, Jan. 6, 1926

T. C. North
Borough Manager

AS CONSTRUCTED

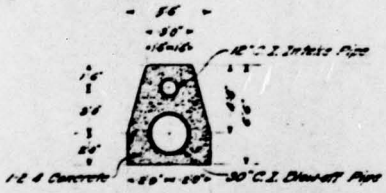
FIGURE 4 (2 of 2) Sheet No. 5-B



Floor Plan of Gate House

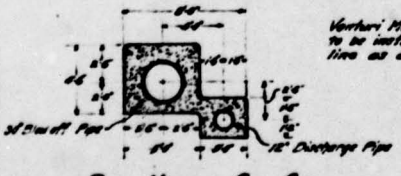
Scale: 3/16" = 1'

Note:
See detail plans of special construction
20 ft. section of Core Wall opposite Gate
Sta. 3+05 to Sta. 3+25



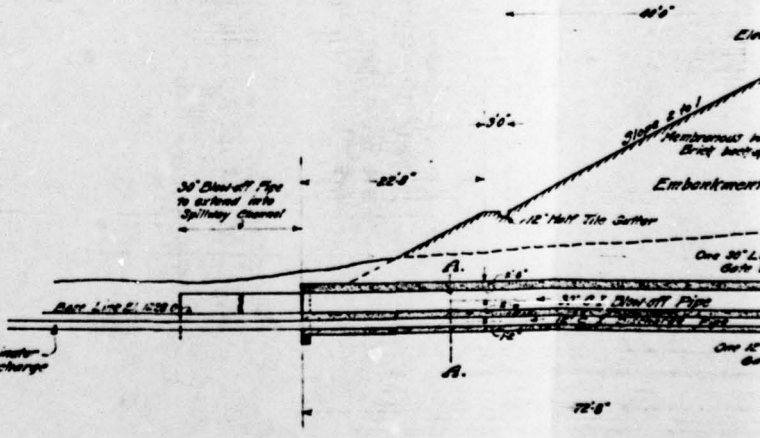
Section B-B.

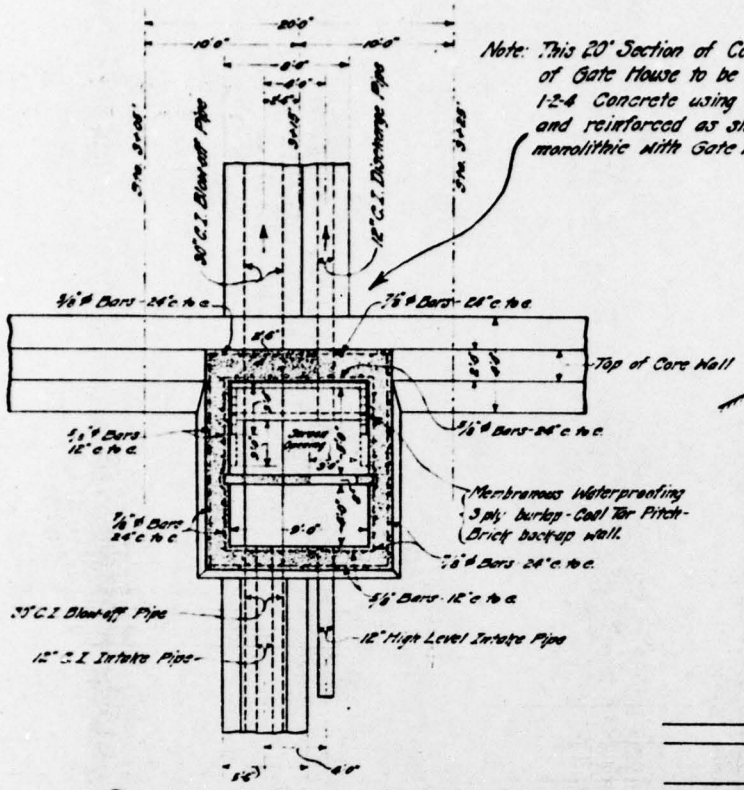
Scale: 3/16" = 1'



Section A-A.

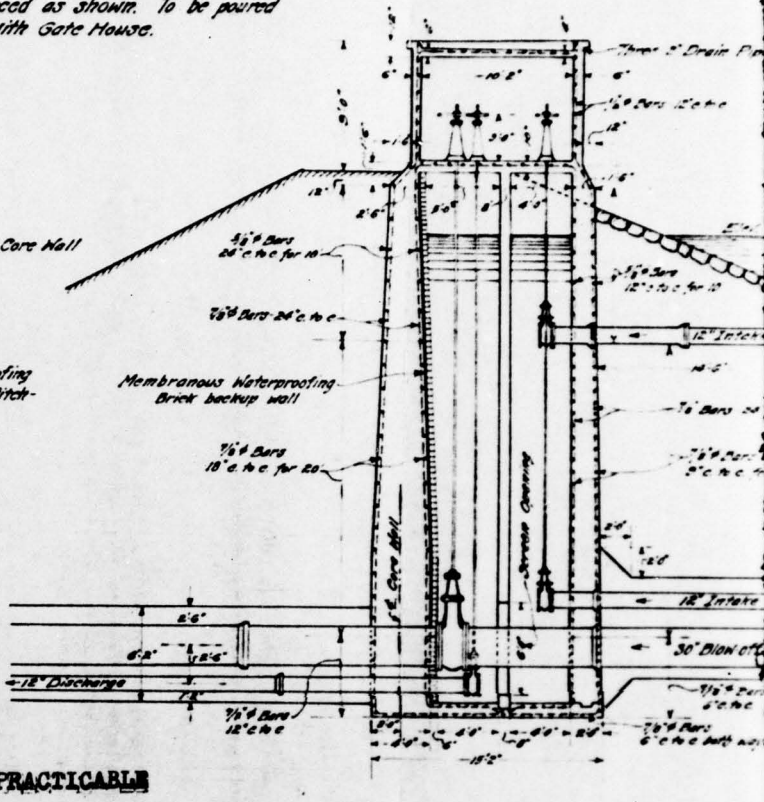
Scale: 3/16" = 1'





Sectional Plan of Gate House

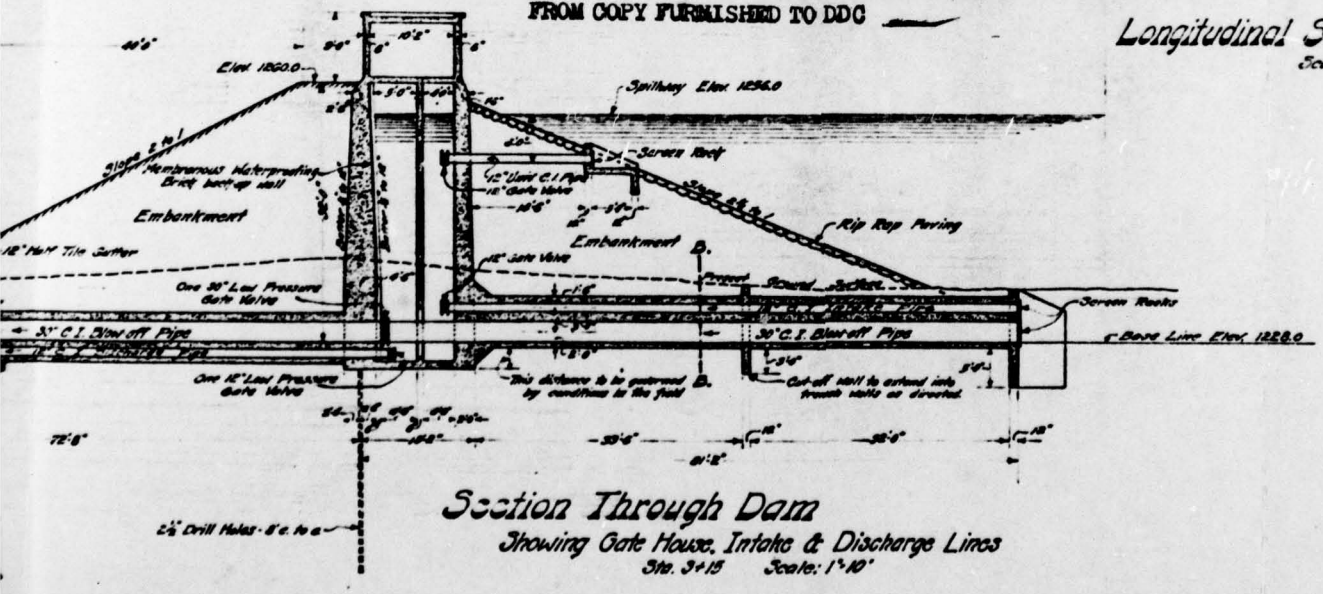
Scale: 3/16" - 1'



Longitudinal Section of Gate House

Scale: 3/16" - 1'

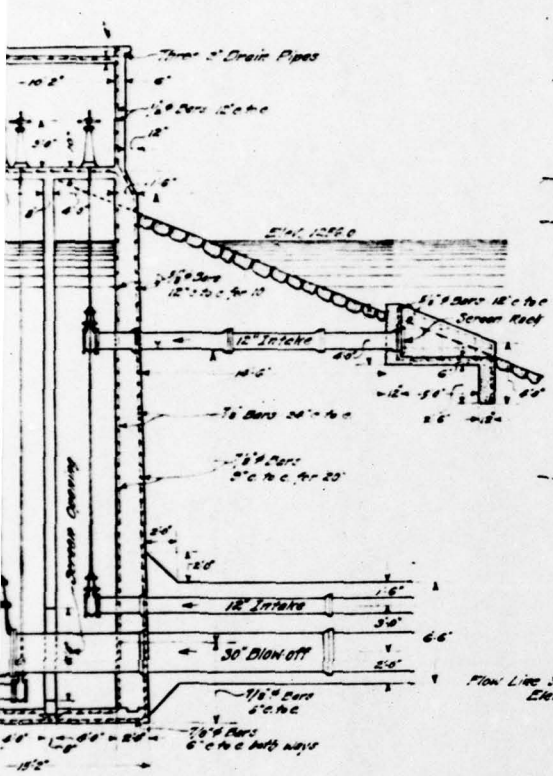
...ams of special construction of
... of Core Wall opposite Gate House
...Sta. 3+25 to Sta. 3+25



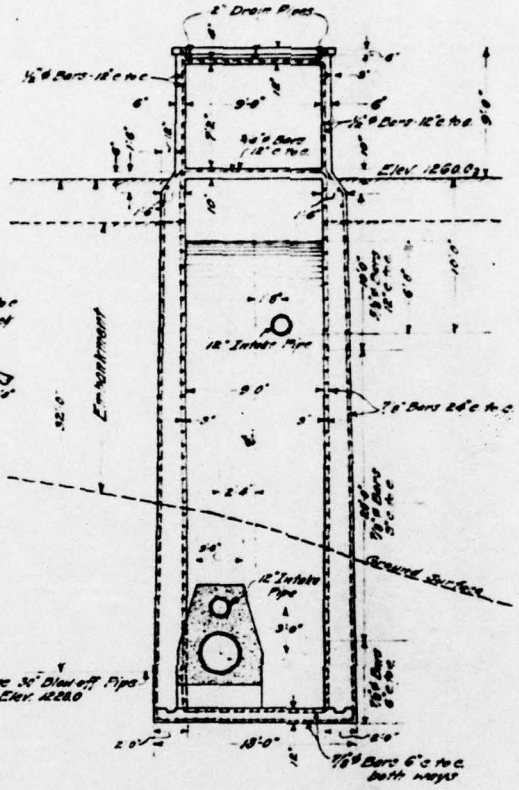
Section Through Dam

Showing Gate House, Intake & Discharge Lines

Sta. 3+15 Scale: 1" = 10'



Section of Gate House
Scale: 3/16" = 1'



End Section of Gate House
Scale: 3/16" = 1'

HILLSIDE RUN
Water Supply

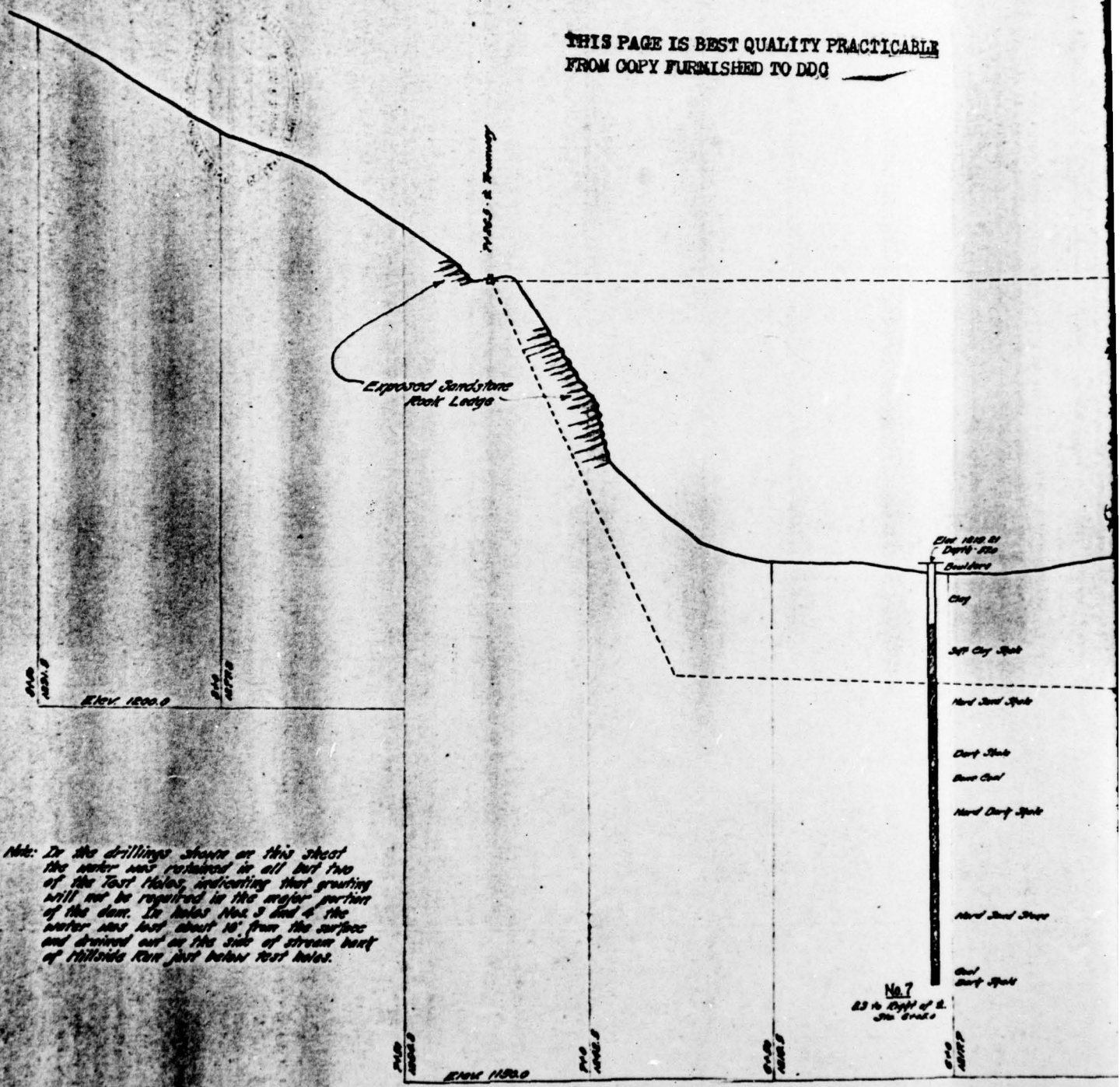
In Derry Twp., Westmoreland Co.
FOR
BLAIRSVILLE BOROUGH
Indiana County

Section Through Dam at Gate House, etc.

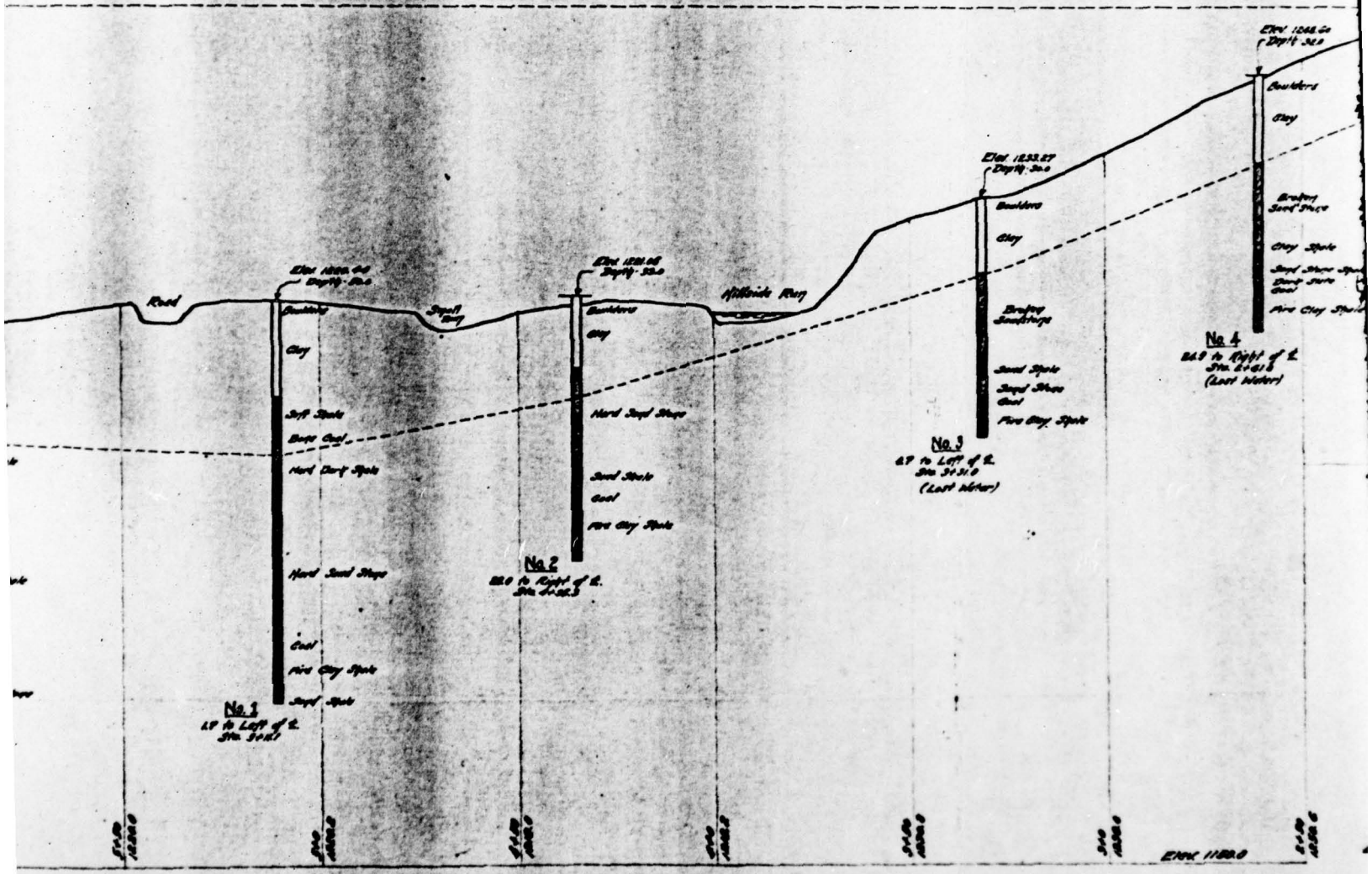
Scales: As shown
June 22, 1926
(Superseding Sheet No. 4 Dated - Jan 1, 1926)

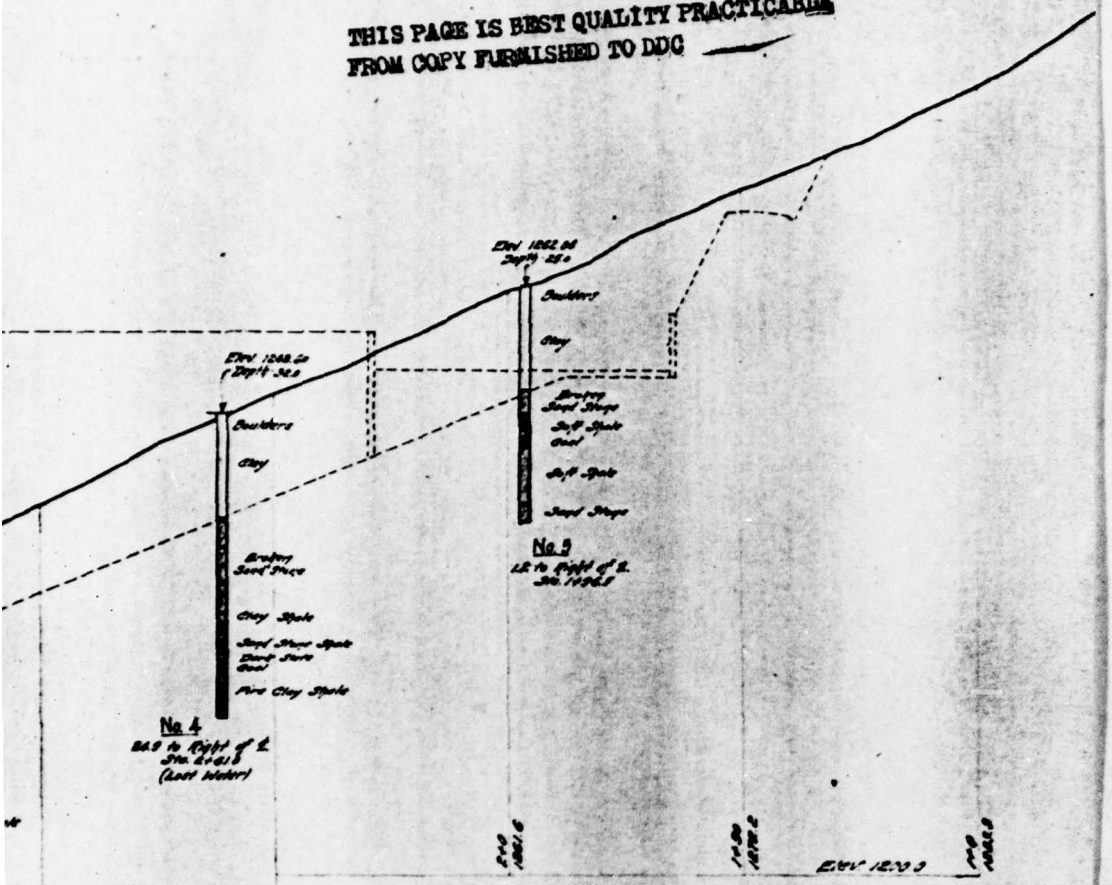
T. C. North
Borough Manager

FIGURE 5 Sheet No. 4-A



Note: In the drillings shown on this sheet the water was retained in all but two of the Test Holes, indicating that grouting will not be required in the major portion of the dam. In holes Nos. 3 and 4 the water was lost about 10' from the surface and drained out on the side of stream bank of Hillside Run just below test holes.





Note: See Sheet No. 18 for Elevation of Dam, Spillway, etc. This Sheet is furnished for foundation Test Hole information only.

HILLSIDE RUN
Water Supply
In Derry Twp. Westmoreland Co.
FOR
BLAIRSVILLE BOROUGH
Indiana County

Test Holes along Proposed Core Wall No. 1

Scales: Hor. 1"=20'
Ver. 1"=10'

June 22, 1926

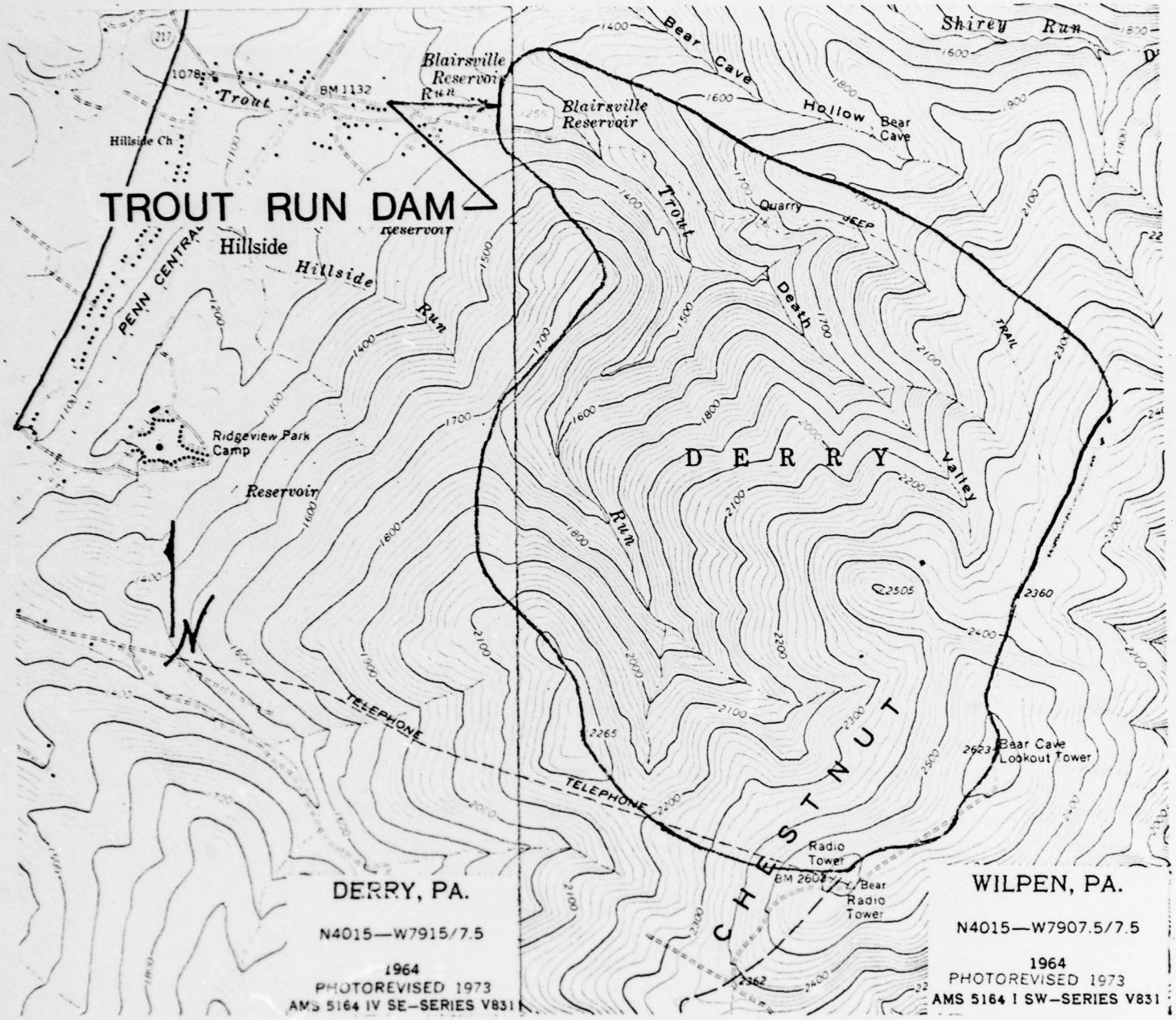
T. C. North
Borough Manager

FIGURE 6

Sheet

APPENDIX G

REGIONAL VICINITY MAP


TROUT RUN DAM
Reservoir
Blairsville Reservoir Run
Blairsville Reservoir
Trout Run
Hillside Run
Hillside
Hillside Ch
BM 1132
1078
PENN CENTRAL
Ridgeview Park Camp
Reservoir
Bear Cave
Hollow
Bear Cave
Shirey Run
Quarry
JEEP
TRAIL
Death Valley
DERRY
Run
TELEPHONE
TELEPHONE
CHESTNUT
Q2505
2360
2623
Bear Cave Lookout Tower
Radio Tower
BM 2608
Bear Radio Tower
2362
2265
N
DERRY, PA.
N4015—W7915/7.5
1964
PHOTOREVISED 1973
AMS 5164 IV SE—SERIES V831
WILPEN, PA.
N4015—W7907.5/7.5
1964
PHOTOREVISED 1973
AMS 5164 I SW—SERIES V831